Characteristics of the Newfoundland and Labrador Atlantic Salmon (*Salmo salar*) Recreational Fishery Based on Angler Logs and Phone Surveys (1994-2013)

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CHARACTERISTICS OF THE NEWFOUNDLAND AND LABRADOR ATLANTIC SALMON (*SALMO SALAR*) RECREATIONAL FISHERY BASED ON ANGLER LOGS AND PHONE SURVEYS (1994-2013)

by

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ABSTRACT

Veinott, G. and Cochrane, N. 2015. Characteristics of the Newfoundland and Labrador Atlantic Salmon (*Salmo salar*) Recreational Fishery based on Angler Logs and Phone Surveys (1994-2013). Can. Manuscr. Rep. Fish. Aquat. Sci. 3082: vii + 51 p.

Anglers of Atlantic Salmon in Newfoundland and Labrador have been self-reporting catch and effort data since 1994 and have also been surveyed annually by phone since 1998. During that time very few significant trends in catch and effort have been observed. On average, anglers consistently catch approximately fourfish per year, two of which they harvest. However, the most commonly reported outcome for anglers with effort was zero catch. The exceptions were Labrador, where respondents with effort often reported a catch of greater than 6 fish, and the South Coast where retention has dropped to approximately 1 fish per angler per year. NL anglers are primarily retention anglers with less than 5% reporting the release of their entire catch. Resource managers wishing to reduce catch and harvest could reduce the season bag limit, and/or limit the number of licences available, which would reduce harvest by reducing total effort.

RÉSUMÉ

Veinott, G. and Cochrane, N. 2015. Caractéristiques de la pêche récréative du saumon de l'Atlantique (*Salmo salar*) à Terre-Neuve-et-Labrador, fondées sur les registres des pêcheurs à la ligne et les renseignements obtenus par sondage téléphonique (de 1994 à 2013). Can. Manuscr. Rep. Fish. Aquat. Sci. 3082: vii + 51p.

Les pêcheurs à la ligne de saumon de l'Atlantique à Terre-Neuve-et-Labrador produisent des rapports volontaires sur les données relatives aux prises et à l'effort depuis 1994 et ils font également l'objet d'un sondage téléphonique annuel depuis 1998. Durant cette période, très peu de tendances importantes en matière de prises et d'effort ont été observées. En moyenne, les pêcheurs à la ligne capturent systématiquement environ quatre poissons par an, dont deux qu'ils récoltent. Cependant, le résultat déclaré le plus fréquemment pour les pêcheurs à la ligne ayant fourni un effort correspondait à une prise nulle. Le Labrador, où les répondants ayant fourni un effort ont souvent déclaré une prise de plus de six poissons, et la côte Sud, où la rétention a diminué pour atteindre environ un poisson par pêcheur par an, constituent des exceptions. Les pêcheurs de Terre-Neuve-et-Labrador sont principalement des pêcheurs conservant leurs prises puisque moins de 5 % ont déclaré la remise à l'eau de la totalité de leurs prises. Les gestionnaires des ressources qui souhaitent réduire les prises et la récolte pourraient réduire la limite saisonnière de prises ou limiter le nombre de permis disponibles, ce qui réduirait la récolte en diminuant l'effort total.

INTRODUCTION

In order to fish for Atlantic Salmon in Newfoundland and Labrador (NL), anglers are required to purchase an Atlantic Salmon angling licence. The licences are produced by the NL government and distributed to retailers throughout the province. Although anyone can obtain a salmon licence, the vast majority (90%) of licence sales over the past 20 years have been to NL residents. For non-residents and individuals under 14 years of age, special regulations exist that restrict where and with whom they can angle (DFO 2014). Starting in 1994 changes were made to the salmon licence, so that it would consist of two parts, a vendor's sales slip and an angler log or stub (both in duplicate) (O'Connell et al. 1998). The vendor's sales slip is used to record information identifying the angler (name, address, gender, and proof of residency) (Fig. 1 top), and is retained by the vendor. The angler stub or log (Fig. 1 bottom) is retained by the angler to keep a record of their fishing activities (catch, effort, rivers fished, etc.) throughout the fishing season. Vendors are expected to return one copy of the sales slip to the province and the other to the Department of Fisheries and Oceans (DFO). Anglers are asked to submit their angling data electronically through the DFO's web page or mail their log to the DFO at the end of the angling season regardless of whether they fished or not.

Twenty-thirteen marks the twentieth year that the Newfound and Labrador region of the DFO has been collecting data on the province's Atlantic Salmon anglers. During that time approximately 348,000 licences have been sold and information on over 170,000 anglers engaging in well over half a million angling trips has been collected. This report is a synthesis of those 20 years of data.

METHODS

TOTAL NUMBER OF LICENCES SOLD

When a salmon licence is sold in NL, the vendor sends a copy of that licence with the licence number, angler name, address, etc. to the DFO. This information is entered into a database and the total number of licences received by the DFO from the vendors is defined as the *total number of licences sold*.

DEFINING RESPONDENTS AND NON-RESPONDENTS

Any angler that purchases a licence is expected to fill out the angler log attached to the licence and submit that data to the DFO either by mail or electronically through the DFO web page. Information from the angler log consists of the licence number, area and river fished, hours fished, catch of small salmon (< 63cm), catch of large salmon (≥ 63cm), and size and number of retained and released salmon. However, in any given year only a small proportion of anglers return their logs voluntarily. Therefore, three times a year, usually starting in mid-October, and ending in January of the next year, reminders are sent to any angler that has not voluntarily returned their log. An exception occurred in 2012 when owing to budgetary constraints only two reminders were mailed out. The

reminder consists of a postcard asking anglers to submit their angling information and a blank angling log for them to fill out in case the original was lost or destroyed. Any angler that submits their angling information either voluntarily or after being prompted are categorized as *respondents*. All other anglers are categorized as *non-respondents*.

TELEPHONE SURVEY OF NON-RESPONDENTS

In 1998, the DFO began a telephone survey of non-respondents. The survey takes place in February or March and covers anglers that fished in the previous calendar year but did not submit their angling log. This provides a grace period for anglers to respond to reminders that were recently sent. After the grace period, 5000 names of non-respondents are selected, at random, and contact is attempted by telephone. Anglers that are contacted and agree to be interviewed are asked to recall the rivers fished, number of days fished, hours fished, and the numbers of small and large salmon caught, retained, and released. The survey continues for 3 weeks and has successfully interviewed an average of 15.6% ± 4% of all non-respondents annually.

DATA HANDLING AND ANALYSIS

Angling data from respondents and non-respondents are entered into an electronic database. Each reported angling event is entered on a separate line so that information such as the total number of angling events, daily catch, rivers fished, etc. can be extracted for each licence holder. Information from the vendors (angler name, address, age, etc.) is entered into a separate database so that angling data can be analyzed without access to the corresponding personal information.

The main metrics presented in this report are based on reported angler catch and effort. Trends in catch and effort, as well as the proportion of anglers catching zero, one, two, etc. fish were examined. However, only noteworthy trends are presented and discussed. Summaries of all data are provided in the appendices.

The examined trends in catch and effort etc. are presented based on geographic regions. First, trends in catch and effort, reported for the province and extrapolated to the entire angling population, are presented (method given below). Next the province is divided into insular Newfoundland and Labrador, and finally the province is divided into regions based on COSEWIC's (Committee on the Status of Endangered Wildlife in Canada) designatable units (DUs) (COSEWIC 2010), and the angling data is presented by DU (Fig. 2). This allowed for a comparison among different regions of the province.

Catch and effort

Angling catch is divided into: retained catch, salmon that are legally retained or kept by the angler; released catch, salmon that are deliberately returned to the water alive after being caught; and total catch, the sum of the retained and

released catch. Angling catch is also categorized by the size of the fish (large and small salmon). However, it has been illegal to retain large salmon in the recreational fishery in insular NL since 1985 and in Labrador since 2011.

Effort is defined by *rod days*. A rod day is any day or part thereof that an angler spends fishing on a given river. For example, if an angler leaves River A and fishes a second river (River B) in the same day, then that would be recorded in the data base as two rod days: one rod day for River A and one rod day for River B. By 1997 it was observed that a substantial number of anglers appeared to be reporting effort only when catch occurred. Therefore, from 1997 to 1999 telephone surveys were carried out to ask anglers whether they had effort without catch and whether they reported that effort. Based on the results of those surveys it was determined that approximately 18% of effort was not being reported. Therefore all annual estimates of effort have been adjusted by 18% to reflect that unreported effort.

To analyze the reported catch and effort data, anglers (respondents and non-respondents) were divided into those that purchased a licence but did not fish (null effort) and those with effort. Average catch per angler (retained, released or total) is simply the number of salmon caught divided by the number of anglers with effort. Average effort is the total number of rod days divided by the total number of anglers with effort. *Catch per unit effort* (CPUE) is catch divided by effort.

Although average catch is a statistic easily understood, recreational catch data often contain an excess of zero catches (O'Neill and Faddy 2003; Taylor et al. 2011). An excess of zero catches creates a skewed distribution in which the mean can still be used for comparison among years, but biases the mean as a measure of central tendency. Therefore, in some cases zero catch is examined separately.

Extrapolating to entire angler population

The angling population in NL is grouped into respondents and non-respondents. From 1994 to 1997, prior to the initiation of the telephone survey, catch and effort data were extrapolated to the entire angling population based on the respondents' data alone (O'Neil et al. 1986; O'Neil et al. 1989; O'Connell et al. 1998). However, the initiation of the telephone surveys in 1998 provided a direct measure of fishing activity by non-respondents. Estimating catch and effort for the entire angling population could now be based on the respondents and non-respondents data. Catch and effort for all non-respondents is estimated by first calculating the average catch and effort of the non-respondents contacted in the telephone survey, then multiplying the average by the total number of non-respondents with effort. Catch and effort for the entire angling population is the sum of the reported respondents catch and effort plus the extrapolated non-respondents catch and effort (Veinott and Cochrane 2014). In 2001, it was

decided to re-calculate non-respondents' catch and effort for 1994 to 1997 based on average catch and effort from the first three years of the non-respondents' phone survey (1998-2000).

RESULTS

ANGLING DATA FOR THE PROVINCE

The total number of salmon angling licences sold in NL peaked in 1997 at over 25,000 then declined to a series low in 2007 (Fig. 3). Since 2007, licence sales have been increasing with over 22,000 sold in 2013. Unfortunately the number of respondents returning their angler logs has not followed the same trend. Numbers and the proportion of anglers returning their logs declined sharply between 1996 and 1998 then stabilized somewhat, but has since reached a series low in 2013 of just 17% (Fig. 4).

Catch (total, retained, and released) extrapolated to the whole angling population is shown in Figure 5. Total catch averaged just over 57,000 fish and the annual trend mirrored, to some extent, the trend in licence sales.This is most likely owing to increased effort in years of high licence sales as catch and effort are highly correlated (Fig. 6). Retained catch (harvest) averaged 45% of the total catch through the time series (Fig. 5).

Average annual total catch per angler (Fig. 7A) has varied very little throughout the time series and has ranged between 3 and 5 fish. Average harvest has not changed much over the time series either. Respondents have been consistently reporting an average harvest of between 1.5 and 2 fish annually, while non-respondents harvest an average of 1.5 fish per year (Fig. 7B). One trend worth noting is in the catch of large salmon. The average number of large fish retained by respondents and non-respondents has been reduced to zero in recent years because of a regulation change, while the average number of large fish released by respondents has been increasing (Fig. 7C). Respondents reported releasing, on average, nearly twice as many large fish in 2013 compared to 1994 (Fig. 7C). Effort and CPUE showed very little change over the last 20 years (Fig. 8A-B). However, non-respondents consistently reported more effort and generally less catch compared to respondents. The increased effort with lower average catches reported by non-respondents resulted in a lower average CPUE for non-respondents relative to respondents (Fig. 8B). One statistic that appears to be increasing is the number of anglers that bought a licence but reported that they did not fish (null effort) (Fig. 9). In recent years (2011-2013) over one-quarter of respondents reported that they did not fish. During the same time over 20% of the non-respondents also stated that they bought a licence but did not fish.

ANGLING DATA BY REGION

To examine and compare trends in catch and effort within NL, the province was divided into regions. First, Labrador and Insular Newfoundland data were

separated; then insular Newfoundland was further divided into the Northeast Coast, South Coast, Southwest Coast, and Northwest Coast. Labrador and the four island divisions overlap with COSEWIC's designatable units and as such are assumed to represent geographically and/or biologically distinct groupings of salmon populations (COSEWIC 2010). Unlike the results for the province which took the reported respondents and non-respondents data and extrapolated them to the entire angling population, the regional trends use reported catch and effort only without extrapolating to the angling population for that region. This was done because of the high variability in angler populations among regions. To account for differences in the number of angler reports between regions; averages and percentages were calculated and presented rather than absolute abundances. As well, comparisons are only made among regions and not between the regions and the province because anglers can fish in multiple regions in any given year.

Labrador

The angling data for Labrador combined angler reports from salmon fishing areas (SFA's) 1, 2 and 14B which is equivalent to COSEWIC's DU 2 (Fig. 2) (COSEWIC 2010). Average total catch by respondents reached a series high in 2013 with respondents reporting catches of over 9 fish per angler (Fig. 10A). Average total catch reported by non-respondents was generally lower that that reported by respondents, but there has been a general upward trend in catch since 2001. In contrast to the increasing total catch reported by both groups, total harvest (large + small salmon retained) declined in the early part of the series and has averaged just over 1 fish per angler in the non-respondents category and approximately 1.5 fish per angler in the respondents category since 2001(Fig. 10B). Effort (Fig. 10C) has remained remarkably consistent for respondents throughout the time series, averaging slightly less than 5 rod days per angler annually. As with the provincial data, non-respondents fishing in Labrador consistently reported greater effort while catching less fish compared to respondents resulting in a lower CPUE for non-respondents (Fig. 10D).

The proportion of respondents reporting a total catch of greater than 6 fish in Labrador has been steadily increasing and reached a series high in 2013 at just over 46% (Fig. 11A). At the same time the number of respondents with effort reporting zero catch declined to about 11% in 2013 (Fig. 11A). These trends are correlated with the number of fish being released in Labrador as more respondents reported releasing more than 6 fish and fewer respondents reported releasing no fish (Fig. 11B). This resulted in the increase in CPUE observed for respondents in Figure 10D. Similar trends were not observed in the non-respondents data as average catch was more variable and the proportion of non-respondents reporting catches greater than 6 fish or zero fish were about equal (25%) (Fig.11C). There was an increase in the percentage of non-respondents reporting fishing 3 to 5 days annually (~40%), while the proportion fishing greater than 10 days annually, decreased slightly to less than 10% (Fig. 12).

Insular Newfoundland

The island of Newfoundland is made up of 12 SFA's and by virtue of the population produces a high proportion of the collected angling data. Therefore, there is very little difference between, for example, the trends in average total catch or average harvest for the island (Fig. 13) compared to the province (Fig. 7A, B). Similarly trends in effort and by default CPUE are nearly identical for the island compared to the province (Compare Fig. 14 to Fig. 8). However, there are interesting differences between the island and Labrador. In Labrador, a high proportion of respondents (>30% in recent years) reported catching more than 6 fish in a season (Fig. 11). On the island the most common outcome for respondents is a catch of zero fish (Fig. 15A-B). The reporting of zero catch is even more pronounced in the non-respondents with greater than 30% of anglers who fished, reporting no catch annually (Fig. 15B).

Related to no catch is the percentage of anglers that report releasing no fish (Fig. 16). Roughly 60% to 70% of respondents and 70% to 80% of non-respondents report releasing no fish. These numbers include anglers that had no catch, or caught only large fish where release is mandatory, but it also reflects a penchant for Newfoundland anglers to retain their catch. For example, in 2013 there were 1913 respondents that reported catching at least one small fish. Of those only 83 reported retaining no small fish. Therefore, less than 5% of respondents in 2013 voluntarily released all their small catch. The figure was lower for non-respondents where less than 2.5% released their entire catch of small fish.

For respondents with retained catch there was a sharp increase between 1997 and 1998 in the number of anglers reporting retention of 4 fish (Fig. 17). Between those years the percentage of respondents reporting retention of 4 fish increased from less than 5 to over 15 and has remained at that 15% level since. During the same time the percentage of respondents retaining 3 salmon declined by an equivalent amount. The change in retention was likely driven by changes in the season bag limits, which went from 6 to 4 in 1998, or because of in-season reviews that limited catch for part of the season. In 1999, the River Classification System (Veinott et al. 2013) came into effect, which changed the allowed retention on a river-by-river basis and re-introduced a season bag limit of six salmon. As well, the River Classification System reduced the number of rivers where four salmon could be retained and increased the number where only two salmon could be retained. There were no rivers with a season bag limit of exactly three salmon. This likely explains the decline in the percentage of anglers retaining three salmon and the maintenance of the percentage of anglers reporting a retained catch of four salmon.

Northeast Coast

In this report the Northeast Coast is defined as the area covered by DU3 (SFA's 3 to 8) (Fig. 2). Similar to the comparison between the island and the province,

the Northeast coast drives most of the trends for the island. Two of the largest salmon producing rives, Exploits River and Gander River, are located on the Northeast Coast thus producing a large proportion of the angling activity and angler reports for the island. Similar to the island as a whole, respondents on the Northeast Coast harvested approximately 1.7 small salmon per angler per year, while non-respondents averaged slightly less than 1.5 salmon per angler per year. However, there appears to be an increasing trend in average total catch and harvest especially in the respondents' category (Fig. 18A-B). Effort reported by respondents has remained constant averaging 5 days per angler per year, while effort by non-respondents showed a slightly declining trend (Fig. 19A). The stability or slight decline in effort coupled with increasing catch and harvest has resulted in an increase in CPUE for respondents in this region (Fig. 19B).

Unlike the island, the proportion of respondents reporting zero catch on the Northeast Coast appears to be steadily declining throughout the time series and is currently at 26% (Fig. 20A). A similar trend appears in the retained catch data where the number of respondents reporting zero harvest reached a series low of 22% in 2011(Fig. 20B). Catch of large fish is trending up as over 6% of anglers reported catching one large salmon in 2013 compared to less than 4% in 1994 (Fig. 20C).

In the non-respondents category, the number of anglers fishing more than 10 days per year has been in decline. It reached a series low of just under 14% in 2012 compared to a series high of 33.6% in 1995 (Fig. 21).

South Coast

The South Coast of the island is made up of SFA's 9 through 12 and overlaps with COSEWIC's DU4. The salmon population of this DU has been designated as *Threatened* by *COSEWIC* (COSEWIC 2010). Nevertheless at the time of writing angling was still permitted on the South Coast.

Unlike other regions of the province examined so far average, harvest on the South Coast has been declining for respondents and non-respondents (Fig. 22A). Respondents harvested on average one fish per angler per year in 2013 compared to a peak of 1.7 fish per year in 1995. However, the average number of small salmon being released by respondents had been increasing until 2011 (Fig. 22B). Average effort declined slightly in both categories (Fig. 23A) over the time series resulting in little change in CPUE (Fig. 23B) despite continued declining abundance in the main index river (Conne River) for the South Coast (Robertson et al. 2013).

A catch of zero fish is still the most commonly reported outcome for anglers on the South Coast. Over 30% of respondents and over 50% of non-respondents with effort on the South Coast reported that they caught no fish in 2013 (Fig. 24). Retention is still an important component of the data as 60% or more of

respondents and 70% or more of non-respondents consistently reported releasing no fish (Fig. 25). There was a large increase in 1999 in the proportion of respondents that reported retaining 2 fish (Fig 26). This corresponded to a drop in the percentage retaining 3 fish and is most likely a result of the implementation of the River Classification System (Veinott et al. 2013), which reduced the season bag limit on many South Coast rivers to 2 fish.

Southwest Coast

The Southwest Coast is made up of a single SFA (13) (Fig. 2) and is its own COSEWIC DU (DU5) (COSEWIC 2010). This is because the salmon populations in the Southwest Coast rivers have a multi-sea-winter salmon stock component not observed anywhere else on the island. Multi-sea-winter salmon generally return to their home rivers to spawn for the first time as large salmon (>63 cm).

The trends in catch and effort on the Southwest Coast tend to be in alignment with the other regions. The exception is in the statistics on large catch. Both respondents and non-respondents averaged greater catch of large salmon on the Southwest Coast compared to the other insular regions (Fig. 27A-B). Over the time series, respondents reported releasing an average of 0.67 large salmon per angler per year and non-respondents reported an average catch of 0.53 large salmon per year. Labrador excepted, the next closest region was the Northwest Coast (discussed below) with an average release of 0.30 large salmon per angler per year. Labrador, however, with respondents reporting an average catch of over one large salmon annually, was the region with the greatest reported catch of large salmon per angler.

Northwest Coast

The Northwest coast is comprised of a single SFA (14A) and corresponds to COSEWIC's DU6. The separate COSEWIC designation was based on geography, geology and the smolt migration route northward through the Strait of Belle Isle (COSEWIC 2010).

There was little of note within the catch and effort statistics from the Northwest Coast. Anglers fishing rivers in SFA 14A reported catch and effort very similar with the remainder of the island. One exception is average total catch, which reached a series low in 2013 for respondents and non-respondents of 2.5 and 1.4 fish per angler, respectively (Fig. 28). However, anecdotal reports for 2014 suggest a better than average fishing season on the Northwest Coast so 2013 may be an anomaly. As in other parts of the province, the most commonly reported outcome of a fishing trip was zero catch, however, for those with catch retention rates were high.

DISCUSSION

Self-reported angling data should always be viewed with some caution as biases are inherent in such programs (Pollock et al. 1994). Often respondents consist of the more avid angler (Dorow and Arlinghaus 2011) and catch statistics and biological characteristics (lengths and weights) can be exaggerated (Essig and Holliday 1991). Low response rates can also cause problems as the question of a representative sample becomes a concern. Despite the potential problems with an angler diary or log program, many have reported successful outcomes from such programs. Kerr (2007), based on angler diary programs in Ontario, concluded that muskellunge (*Esox masquinongy*) catch rates had improved and attributed the improvement to new minimum size limit regulations and increased catch-and-release practices. Long-term changes in pike (*Esox Lucius*) populations were revealed through voluntary angler log books (Jansen et al. 2013) and trends in steelhead (*Oncorhynchus mykiss*) abundance from an angler questionnaire were validated by fisheries independent data (Smith et al. 2000). In their study of angler diary programs in Ontario, Cooke et al. (2000) found that frequent contact with participants through some sort of a reminder, similar to whatwas used in this report, was a characteristic of successful angler diary programs.

If we assume that the trends observed in catch and CPUE in this study are an accurate reflection of the NL angler's experience, then for anglers on the island there has been very little change over the last 20 years. Average catch per angler per year has changed very little and CPUE has remained stable. There were some regional improvements. There was a slight increase in average catch with less effort for anglers on the Northeast Coast, and Labrador saw a steady increase in total average catch of respondents over the 20 years. Improved catch on the Northeast Coast can probably be attributed to the increase in returns observed on Exploits River (Bourgeois et al. 2012). Although not part of this study, catch and abundance on the Exploits River are highly correlated (unpublished data this office). The increase in catch for Labrador respondents may be related to increased abundance as Labrador rivers have shown a steady increase in returns since the early 1990's (ICES 2014). Another possibility for Labrador is that respondents from Labrador may be more avid, specialized anglers. Labrador is isolated and requires considerable commitment and expense to angle there recreationally. Respondents are often the more avid anglers (Dorow and Arlinghaus 2011; Bray and Schramm 2001), and Beardmore et al. (2011) found that specialized or committed anglers were more catch-oriented. If respondents in Labrador are motivated by catch, then their angling experience has been improving.

A difference in catch and effort between respondents and non-respondents was not unexpected as many studies have shown non-response bias in angling surveys (Fisher 1996; Connelly and Brown 1995; Connelly et al. 2000). However, in our study non-respondents were surveyed directly so there was no need to adjust the respondents' data to account for non-response. Veinott and Cochrane

(2014) showed that given the number of non-respondents sampled each year in the NL licence stub program, the margin of error on the catch and effort statistics should be less than 5% suggesting that the survey is providing an accurate estimate of the non-respondents' **memory** of their catch and effort. Unfortunately re-call bias has never been studied in this population. Regardless, if the non-response data is believed, then there is a clear difference in catch and effort between the respondents and non-respondents. The most striking difference is in effort. Provincially non-respondents have consistently reported 1.5 to 2 times more effort compared to respondents. Combined with less fish caught, non-respondents have consistently lower CPUE, and this is observed across all regions of the province. Is the lower CPUE because non-respondents are less skilled anglers requiring more effort to catch their bag limits? If so, that supports the studies that concluded respondents were the more avid and presumably more skilled anglers (Dorow and Arlinghaus 2011; Bray and Schramm 2001). Intuitively one might expect the more avid angler to fish more often (greater effort), but if the angler is harvest oriented as suggested by the small percentage of NL anglers that release their entire catch, then the more skilled anglers may fill their bag limit with less effort.

Catch and effort are highly correlated in NL which shows that if regulators want to reduce catch, one way to achieve that outcome would be to reduce effort. Effort can increase either by individual anglers fishing more often or increased participation by the general public. Given that average effort for respondents and non-respondents has changed very little over the time series and across regions, attempting to regulate the number of days individual anglers could fish would seem unnecessarily difficult. However, it would be very simple to restrict the number of new entrants to the fishery by limiting the number of available licences. This is common for big game. Another option to reduce catch and harvest is to reduce the bag limits. The last major regulation change in the NL salmon fishery was the introduction of the River Classification System in 1999. This program introduced seasonal and daily bag limits on a river-by-river basis effectively reducing the season bag limit to 2 fish on the majority of scheduled salmon rivers within the province. Veinott et al. (2013) concluded that the River Classification System had no effect on effort but reduced overall harvest, and shifted harvest to the rivers with higher allowed retention. This is similar to that reported by Johnston et al. (2011) who speculated that harvest-oriented anglers abandoned a recreational bull trout (*Salvelinus confluentus*) fishery after the implementation of a total catch-and-release regulation despite improved catch rates. Since Veinott et al. (2013) and these data both suggest that anglers in NL are harvest-oriented it is no surprise that the average annual harvest has been approximately 2 fish per angler per year over the time series. It seems likely harvest in NL would adjust to whatever the set bag limit is.

CONCLUSIONS

There were very few significant trends observed in catch and effort over the 20 year time series of the angler log program. Anglers consistently averaged a catch of approximately 4 fish per year and harvested approximately 2 each. However, the most commonly reported outcome for anglers with effort was zero catch. The exception was Labrador, where respondents with effort often reported a catch of more than 6 fish, and the South Coast where retention has dropped to approximately 1 fish per angler per year. NL anglers are primarily retention anglers with less than 5% reporting the release of their entire catch. Resource managers wishing to reduce catch and harvest could reduce the season bag limit, or reduce the number of available licences, which would reduce harvest by reducing effort.

REFERENCES

Beardmore, B., Haider, W., Hunt, L.M. and Arlinghaus, R. 2011. The importance of trip context for determining primary angler motivations: Are more specialized anglers more catch-oriented than previously believed? N. A. J. Fish. Manag. 31: 861-879.

Bourgeois, C.E., Dempson, J.B., Reddin, D.G., Veinott, G.I., Robertson, M.J., Poole, R., and Cochrane, N.M. 2012. Status of Atlantic salmon (Salmo salar L.) stocks of the Newfoundland and Labrador Region (SFAs 1-14A), 2010. DFO Can. Sci. Advis. Sec. Res. Doc. 2011/117. iv + 58 p.

Bray, G.S. and Schramm, H.L. 2001. Evaluation of a statewide volunteer angler diary program for use as a fisheries assessment tool. N. A. J. Fish. Manag. 21: 606-615.

Connelly, N.A. and Brown, T.L. 1995. Use of angler diaries to examine biases associated with 12-month recall on mail questionnaires. Trans. Amer. Fish. Soc. 124:413-422.

Connelly, N.A., Brown, T.L., Knuth, B.A. 2000. Assessing the importance of recall bias and nonresponse bias and adjusting for those biases in statewide angler surveys. Human Dimensions of Wildlife 5:19-29.

Cooke, S.J., Dunlop, W.I., MacClennan, D. and Power, G. 2000. Applications and characteristics of angler diary programmes in Ontario, Canada. Fish. Manag. Ecol. 7:473-487.

COSEWIC. 2010 http://0101.nccdn.net/1_5/042/0f6/076/atlantic_salmon_2011-en.pdf

DFO. 2014. Newfoundland and Labrador Anglers Guide 2014-2015. Communications Branch, Fisheries and Oceans Canada. DFO/2014-1920 ISSN: 1924-6021.

Dorow M. & Arlinghaus R. 2011. A telephone-Diary-Mail approach to survey recreational fisheries on large geogreaphic scales, with a note on annual landings estimates by anglers in Northern Germany. *American Fisheries Society Symposium* 75, 319-344.

Essig, R.J. and Holliday, M.C. 1991. Development of a recreational fishing survey: the marine recreational fishing statistics survey case study. Amer. Fish. Soc. Symp. 12: 245-254.

Fisher, M.R. 1996. Estimating the effect of nonresponse bias on angler surveys. Trans. Amer. Fish. Soc. 125:118-126.

ICES. 2014. Report of the Working Group on North Atlantic Salmon (WGNAS), 19–28 March 2014, Copenhagen, Denmark. ICES CM 2014/ACOM:09. 433 pp.

Jansen, T., Arlinghaus, R., Als, T.D. and Skov, C. 2013. Voluntary angler logbooks reveal long-term changes in a lentic pike, *Esox lucius*, population. Fish. Manag. Ecol. 20:125-136.

Johnston, F.D., Arlinghaus, R., Stelfox, J. and Post, J.R. 2011. Decline in angler use despite increased catch rates: Anglers' response to the implementation of a total catch-and-release regulation. Fish. Res. 110:189-197.

Kerr, S.J. 2007. Characteristics of Ontario muskellunge (*Esox masquinongy*) fisheries based on volunteer angler diary information. 2007. Environ. Biol. Fish. 79:61-69.

O'Connell, M.F., Cochrane, N.M. and Mullins, C.C. 1998. An analysis of the license stub return system in the Newfoundland Region, 1994-97. Canadian Stock Assessment Secretariat, Research Document 98/111.

O'Neill, M.F. and Faddy, M.J. 2003. Use of binary and truncated negative binomial modelling in the analysis of recreational catch data. Fish. Res. 60: 471-477.

O'Neil, S.F., Bernard, NM. And Singer, J. 1986. 1985 Atlantic salmon sport catch statistics, Maritime Provinces. Can. Data Rep. Fish. Aquat. Sci. 600: v + 71 p.

O'Neil, S.F., Newbould, S.K. and Picard, R. 1989. 1987 Atlantic salmon sport catch statistics, Maritime Provinces. Can. Data Rep. Fish. Aquat. Sci. 770: v + 73 p.

Pollock, K.H., Jones, C.M. and Brown, T.L. (eds) (1994) *Angler Survey Methods and their Applications in Fisheries Management*. Amer. Fish. Soc. Spec. Pub. 25. Bethesda, MD: Amer. Fish. Soc, 371 pp.

Robertson, M.J., Weir, L.K., and Dempson J.B. 2013. Population viability analysis for the South Newfoundland Atlantic Salmon (*Salmo salar*) designatable unit. DFO Can. Sci. Advis. Sec. Res. Doc. 2013/090. vii + 26 p.

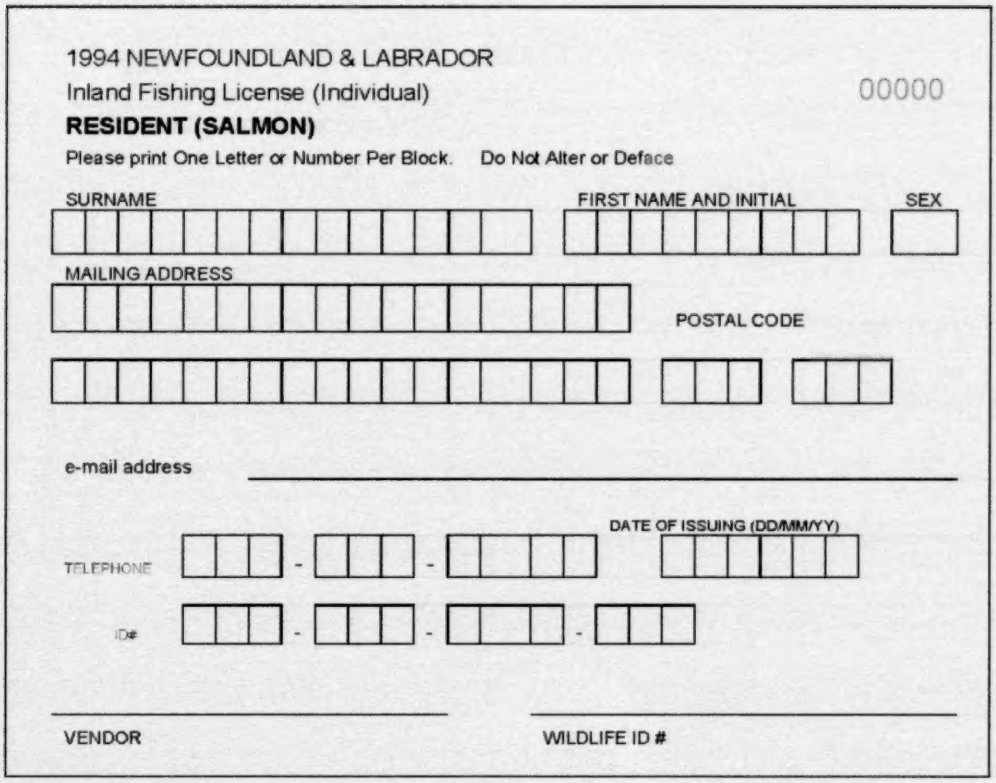
Smith, B.D., Ward, B.R. and Welch, D.W. 2000. Trends in wild adult steelhead (*Oncorhynchus mykiss*) abundance in British Columbia as indexed by angler success. Can. J. Fish. Aquat. Sci. 57:255-270.

Taylor, S.M., Webley, J.A.C. and Mayer, D.G. 2011. Improving the precision of recreational fishing harvest estimates using two-part conditional general linear models. Fish. Res. 110: 408-414.

Veinott, G. and Cochrane, N. 2014. Accuracy and utility of the Atlantic Salmon licence stub (angler log) return program in Newfoundland and Labrador. Can. Sci. Advis. Secret. Res. Doc. 2014/035.

Veinott, G., Cochrane, N. and Dempson, J.B. 2013. Evaluation of a river classification system a a conservation measure in the management of Atlantic salmon in insular Newfoundland. Fish. Manag. Ecol. 20:454-459.

FIGURES



1994 NEWFOUNDLAND & LABRADOR
Inland Fishing License (Individual) 00000
RESIDENT (SALMON)
Please print One Letter or Number Per Block. Do Not Alter or Deface

SURNAME | FIRST NAME AND INITIAL | SEX

MAILING ADDRESS

POSTAL CODE

e-mail address

DATE OF ISSUING (DD/MM/YY)

TELEPHONE - -

ID# - - -

VENDOR | WILDLIFE ID #

IF YOU DID NOT FISH PLEASE CHECK ☐ Licence Number
IMPORTANT: Record all days fished even if you had no catch. 00000
(Return Copy)

1994 Date Day	Mo	River	Zone	Hours Fished	Small Retained	Small Released	Large Retained	Large Released

Figure 1. Example of a recreational Atlantic Salmon licence issued in Newfoundland and Labrador. Bottom portion is the angler log.

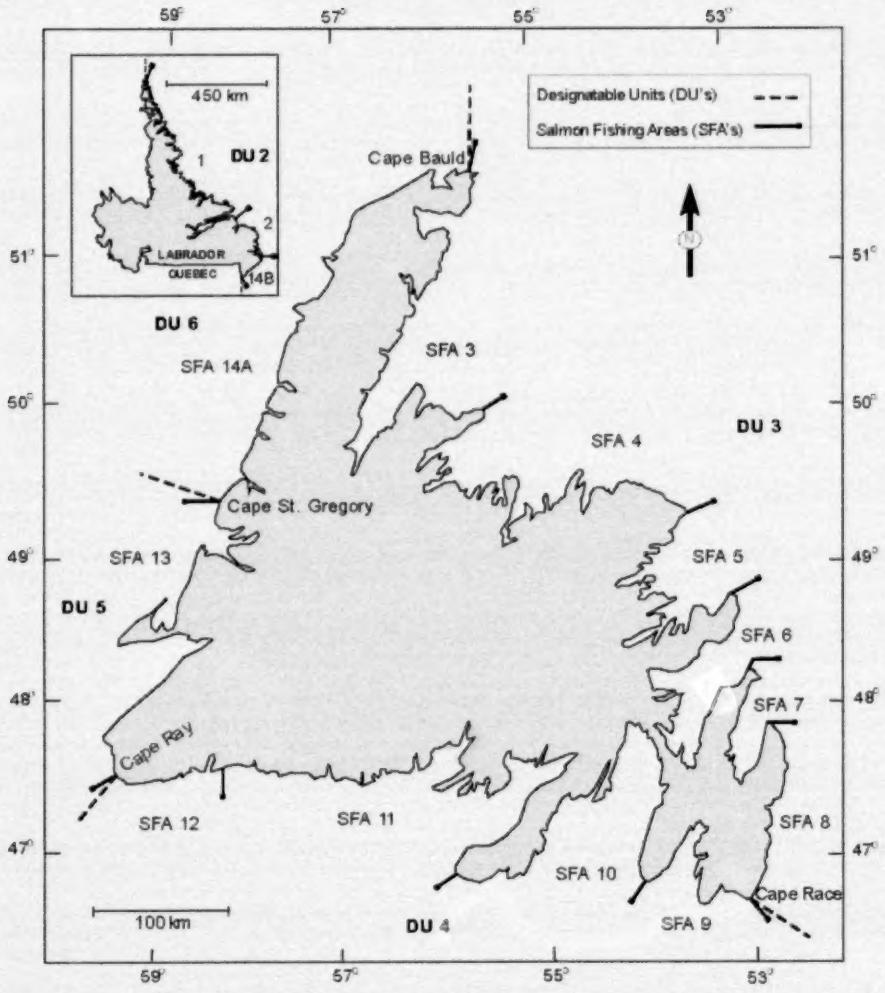


Figure 2. Map of Insular Newfoundland and Labrador (insert) showing COSEWIC Designatable Units (DU) and Salmon Fishing Areas (SFA).

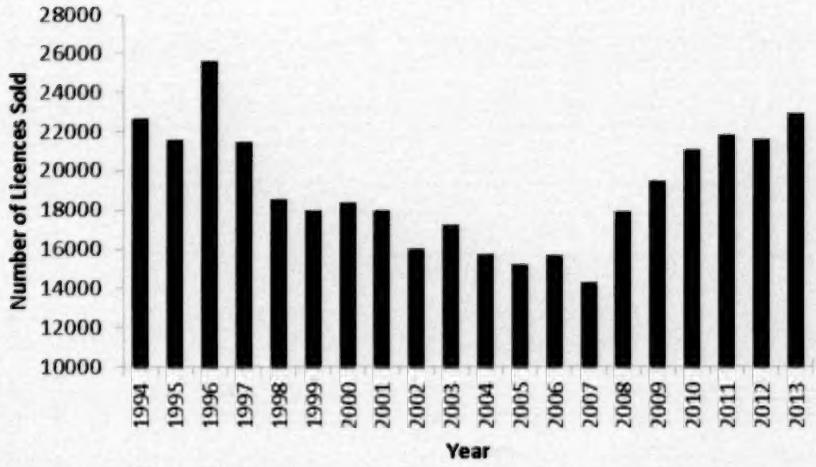


Figure 3. Total Number of recreational Atlantic Salmon licences sold in Newfoundland and Labrador by year.

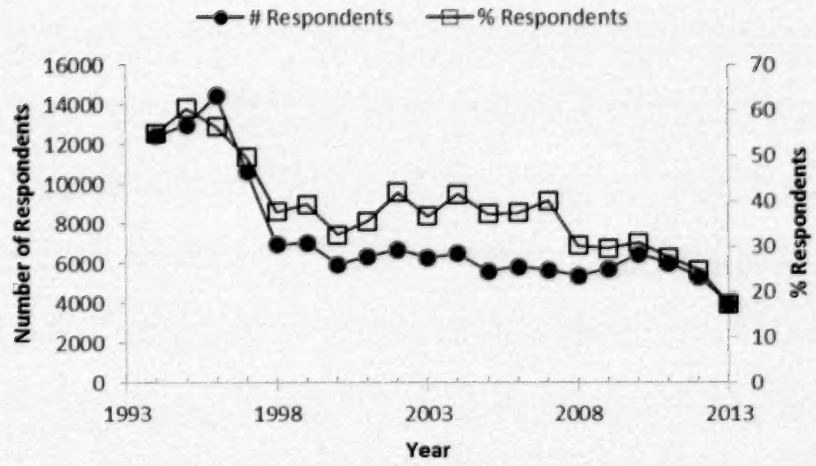


Figure 4. Trend in number and proportion of Atlantic Salmon anglers returning their angler logs (Respondents) in Newfoundland and Labrador from 1994 to 2003. Closed circles are number of respondents. Open squares are percent of respondents.

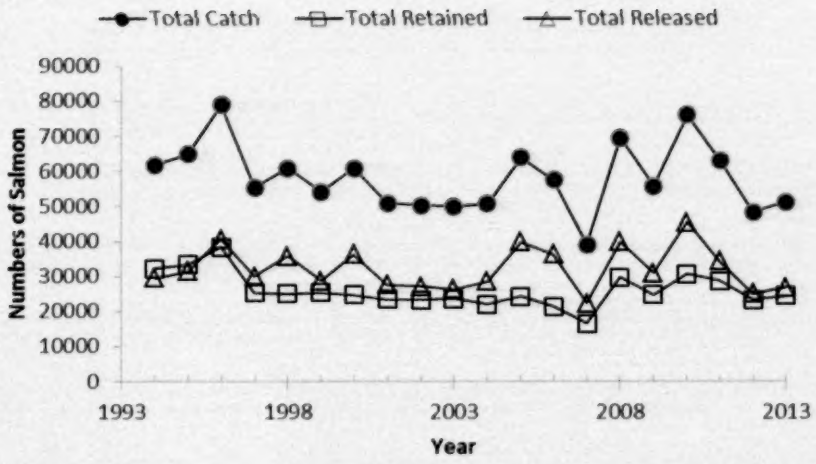


Figure 5. Trends in angling catch of Atlantic Salmon in Newfoundland and Labrador from 1994 to 2013. Closed circles are total catch; open triangles total released; open squares total retained.

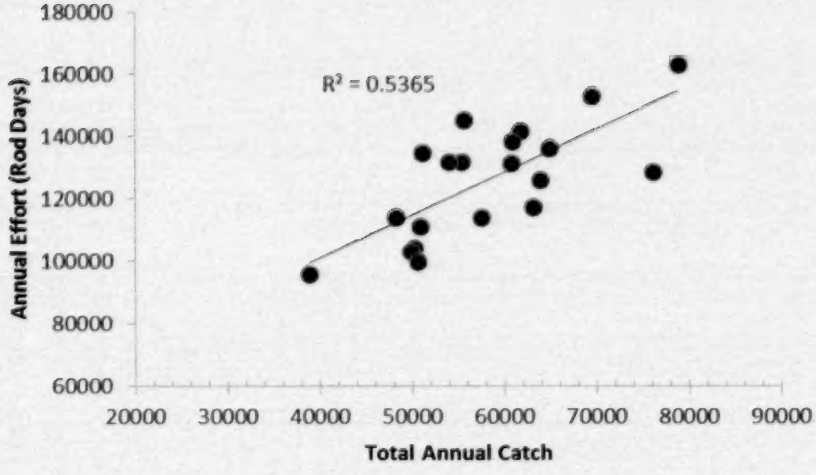


Figure 6. Relationship between total annual catch of Atlantic Salmon and angler effort in Newfoundland and Labrador from 1994 to 2013 (closed circles). Straight line is least squares regression line with an R^2=0.54.

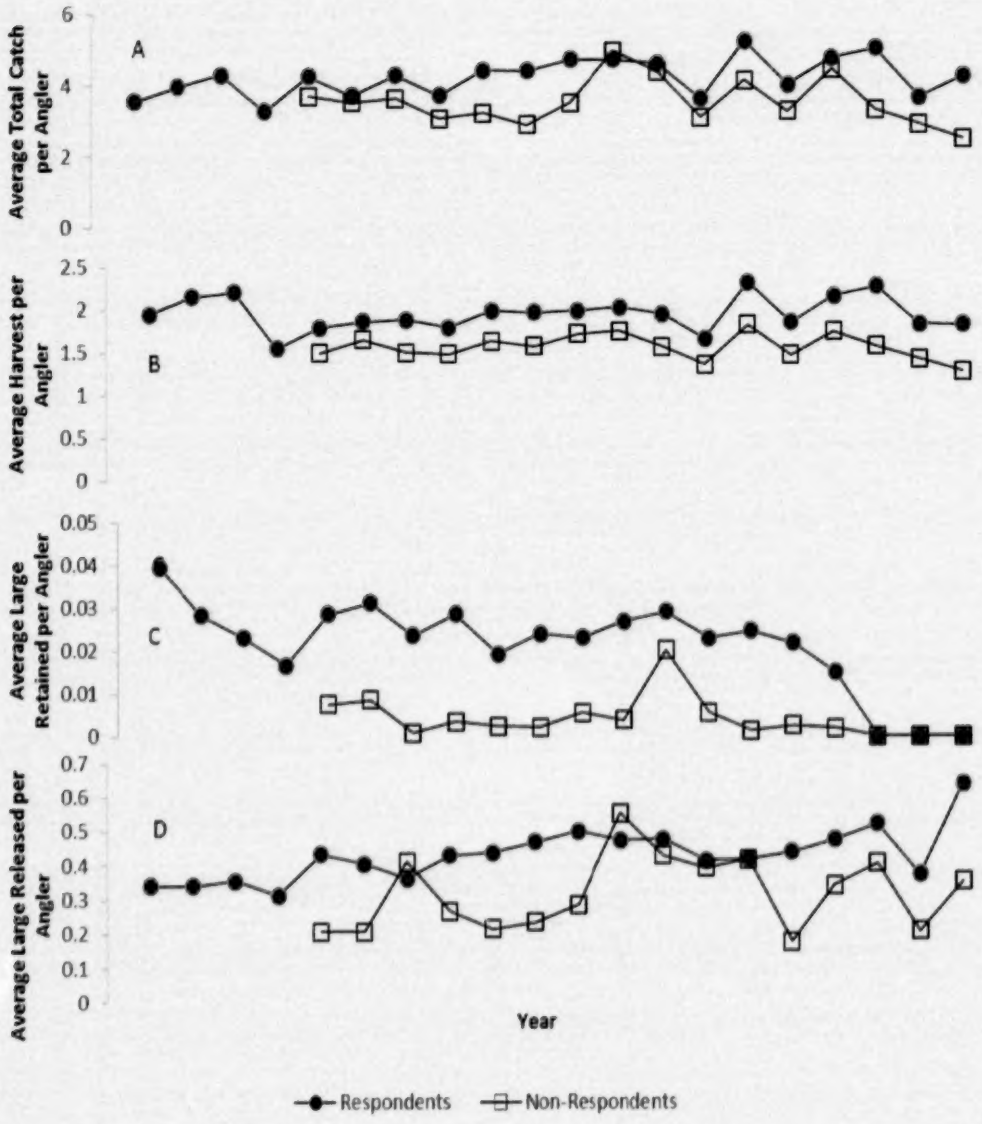


Figure 7. Trends in average annual total catch (A), total harvest (B), large harvest (C), and small harvest (D), of Atlantic Salmon by respondents (closed circles) and non-respondents (open squares) in Newfoundland and Labrador from 1994 to 2013.

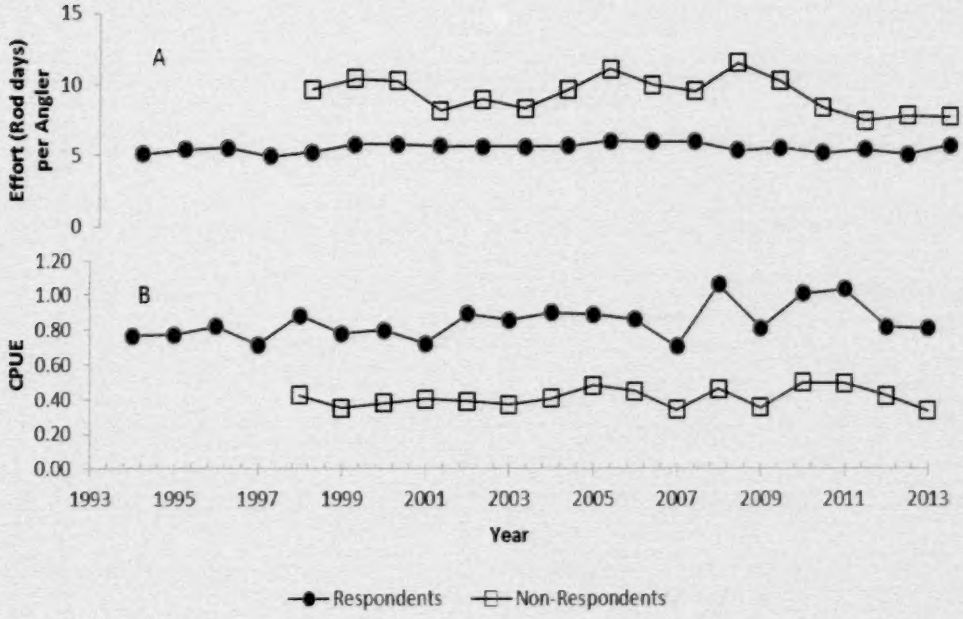


Figure 8. Trends in annual effort (A) and CPUE (B) of respondents (closed circles) and non-respondents (open squares) in Newfoundland and Labrador's recreational Atlantic Salmon fishery from 1994 to 2013.

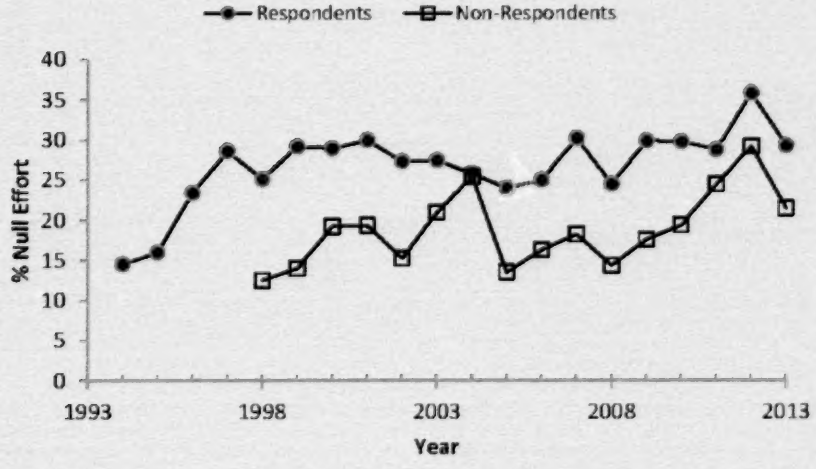


Figure 9. Trends in the percentage of respondents (closed circles) and non-respondents (open squares) that bought a recreational Atlantic Salmon licence in Newfoundland and Labrador, but did not fish (Null Effort), from 1994 to 2013.

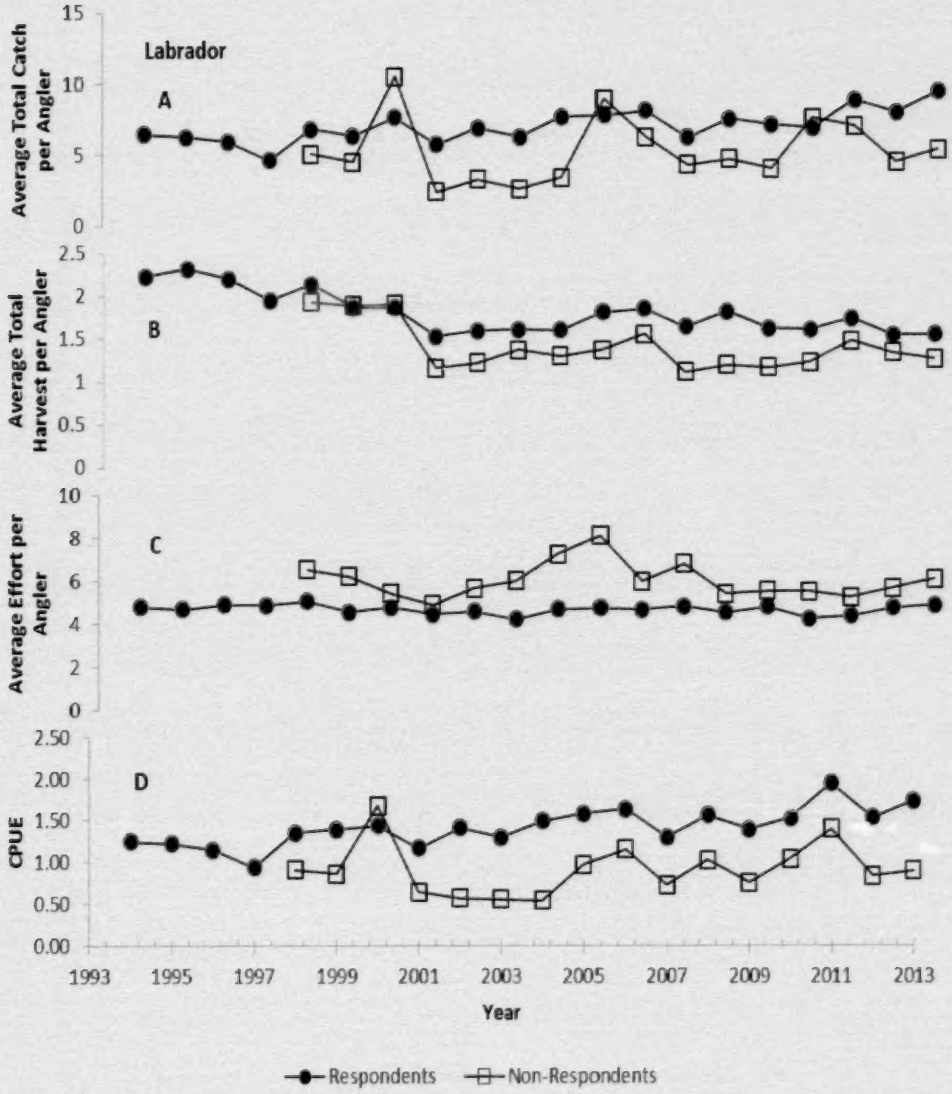


Figure 10. Trends in average annual total catch (A), harvest (B), effort (C) and CPUE (D) by respondents (closed circles) and non-respondents (open squares) in Labrador's recreational Atlantic Salmon fishery from 1994 to 2013.

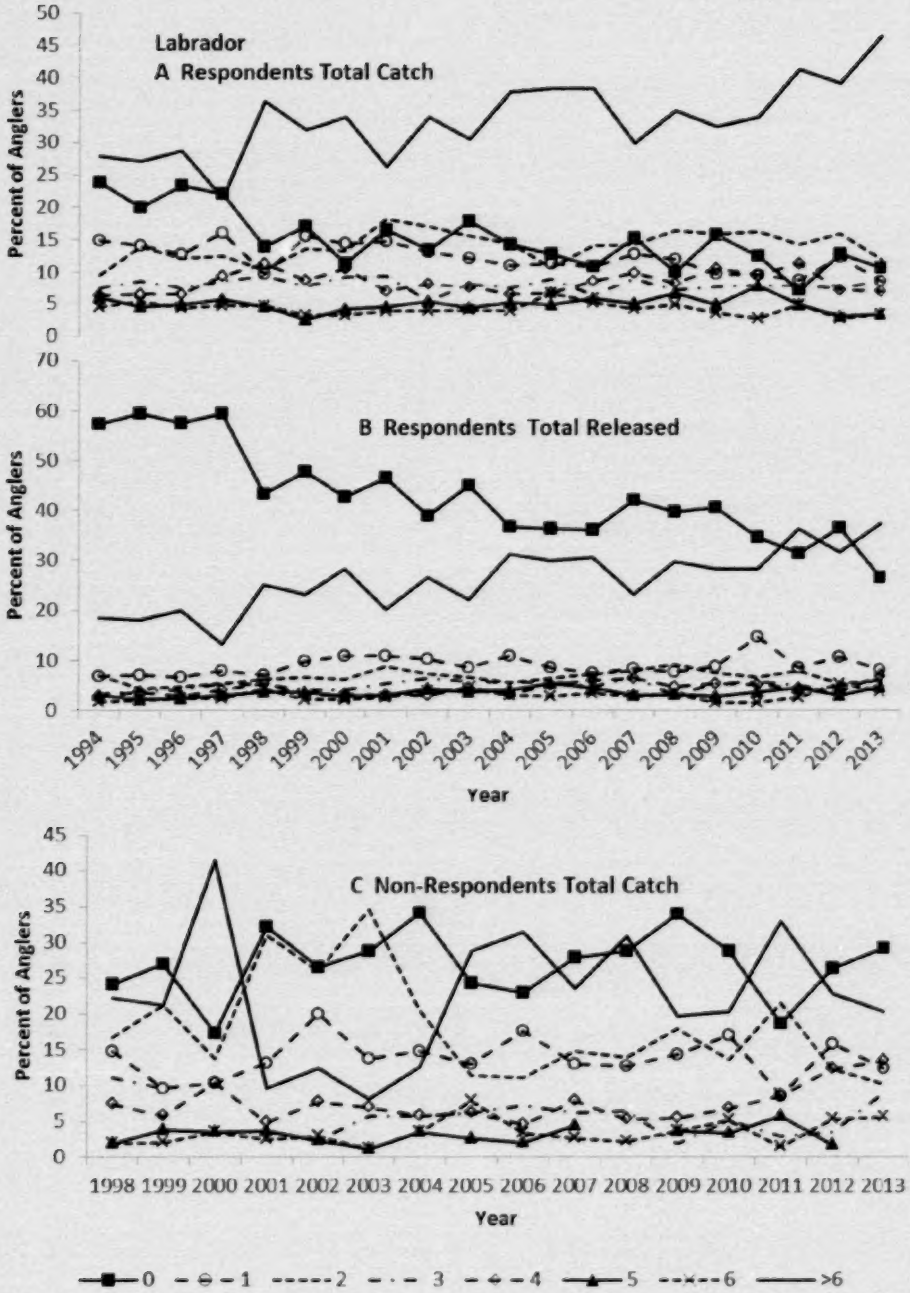


Figure 11. Trends in the percent of respondents reporting a total annual catch (A), or total annual release (B) of 0 to >6 Atlantic Salmon in Labrador. Total reported catch of non-respondents is given in C. Each line represents a different number of fish caught or released: solid line with squares = 0 fish, dashed line with open circles 1 fish, dashed line = 2 fish, dashed dotted line 3 fish, dashed line with open diamonds 4 fish, solid line with triangles 5 fish, dashed line with xs 6 fish, and solid line >6 fish.

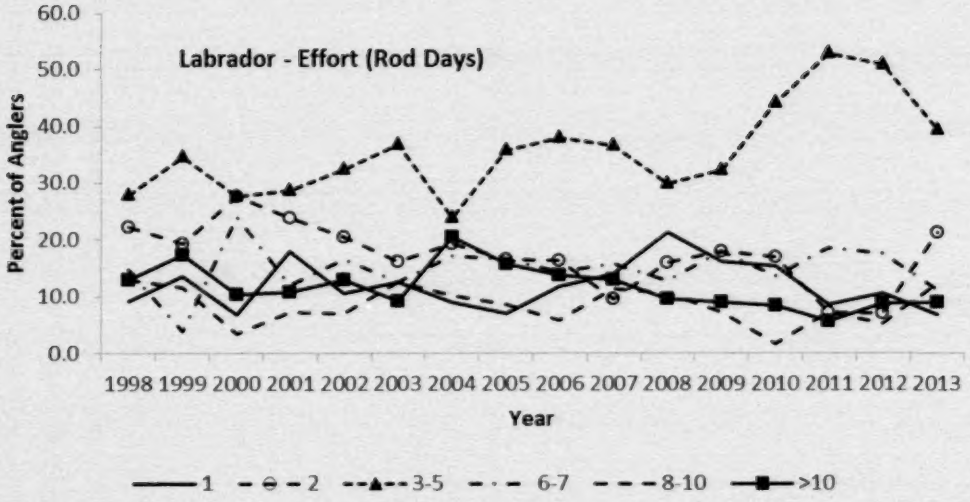


Figure 12. Trends in the percent of non-respondents reporting varying levels of effort (rod days) in the recreational Atlantic Salmon fishery in Labrador from 1998 to 2013. Each line represents a different number of days fished: solid line 1 day fished; dashed line with circles 2 days fished, dashed line with triangles 3 to 5 days fished; dashed dotted line 6 to 7 days fished; dashed line 8 to 10 days fished; solid line with squares >10 days fished.

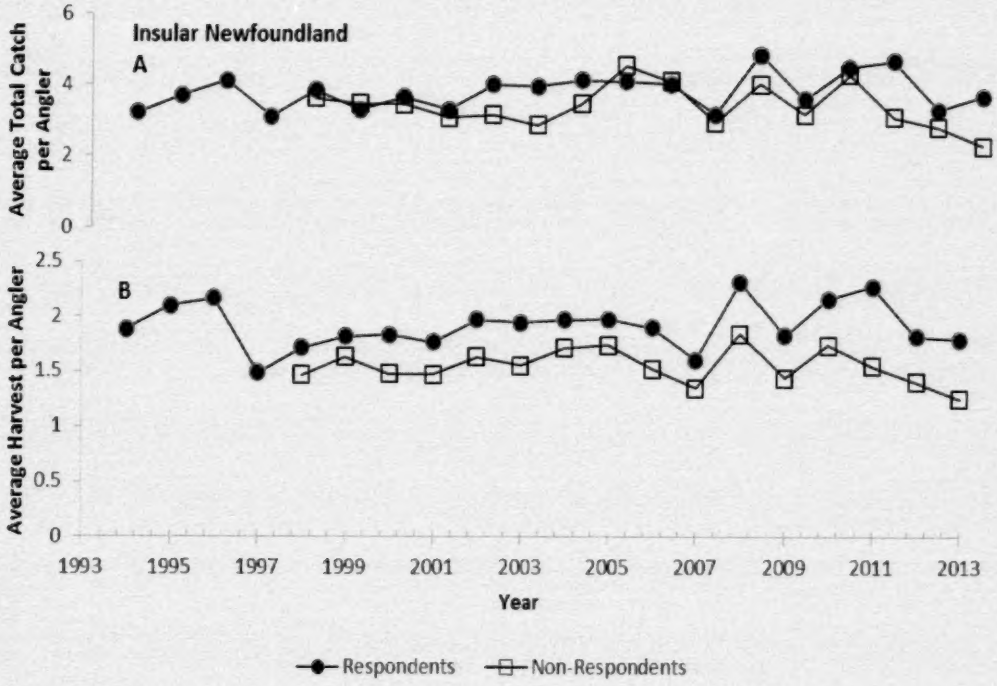


Figure 13. Trends in average annual total catch (A) and harvest (B) of Atlantic Salmon per angler in Insular Newfoundland from 1994 to 2013. Filled circles represent respondents; open squares represent non-respondents.

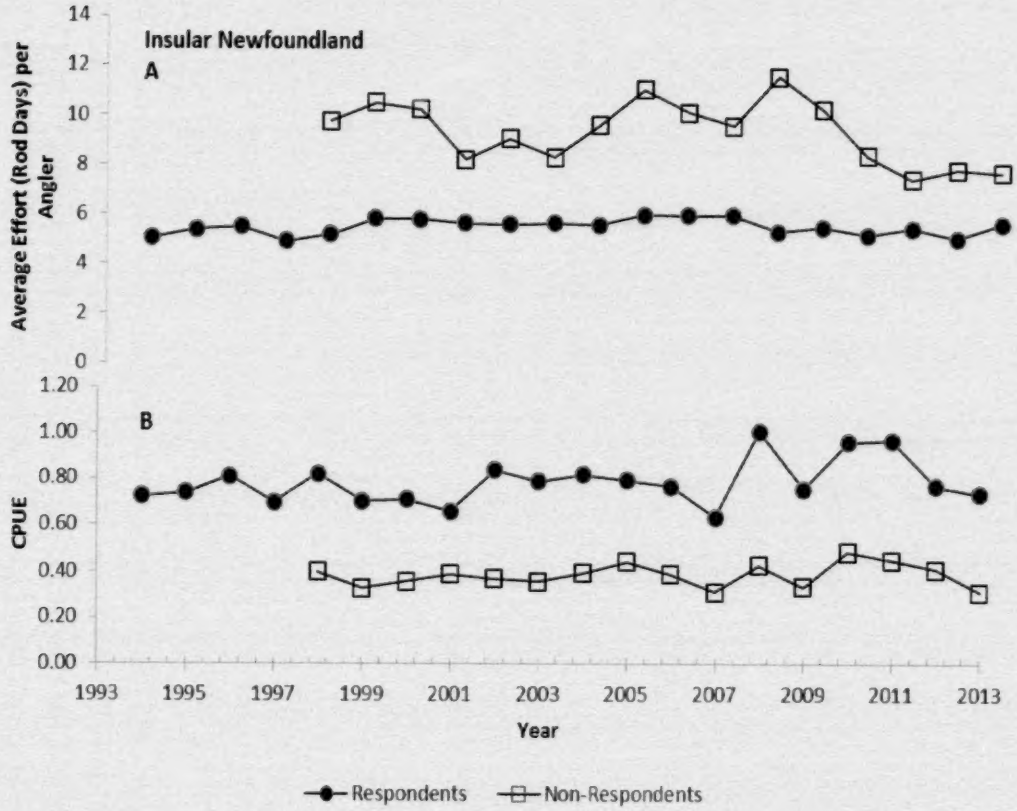


Figure 14. Trends in annual effort (A) and CPUE (B) of Atlantic Salmon anglers in Insular Newfoundland from 1994 to 2013. Filled circles represent respondents; open squares represent non-respondents.

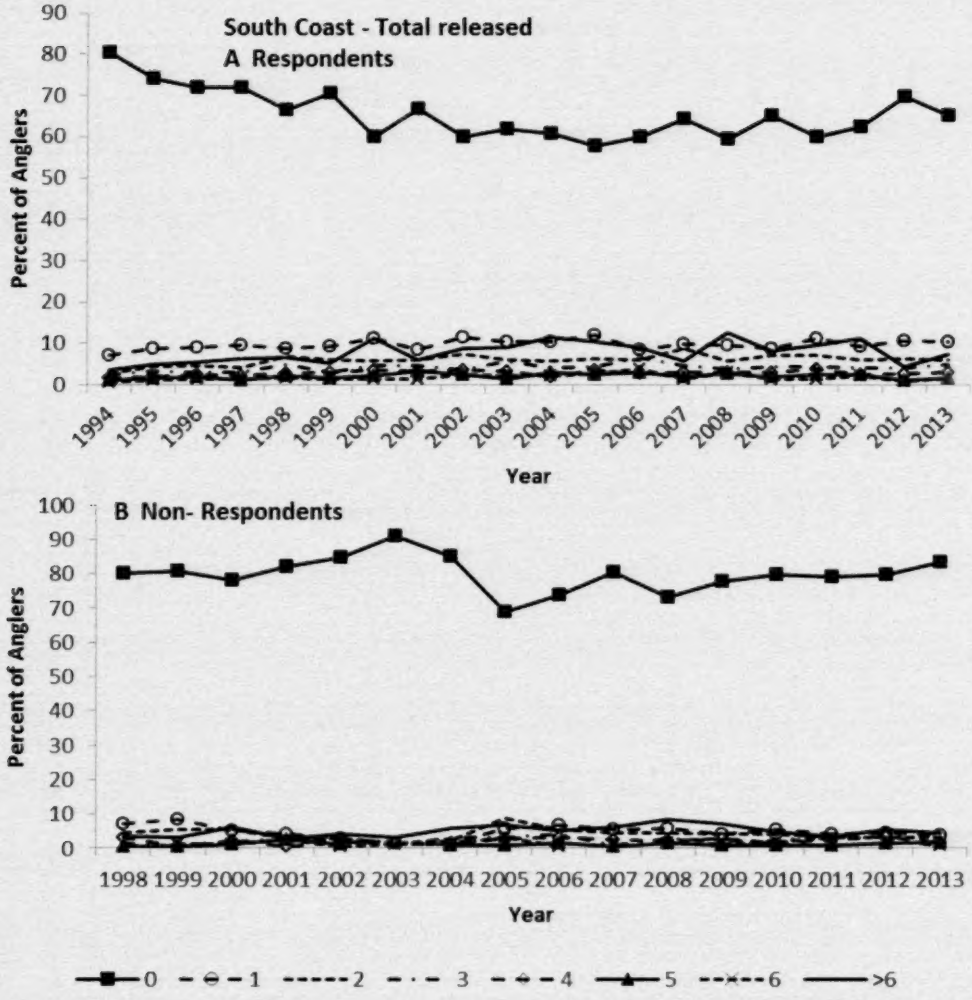


Figure 15. Trends in the percent of respondents (A) and non-respondents (B) reporting total catch of 0 to >6 Atlantic Salmon in Insular Newfoundland. Each line represents a different number of fish caught: solid line with squares = 0 fish, dashed line with open circles 1 fish, dashed line = 2 fish, dashed dotted line 3 fish, dashed line with open diamonds 4 fish, solid line with triangles 5 fish, dashed line with xs 6 fish, and solid line >6 fish.

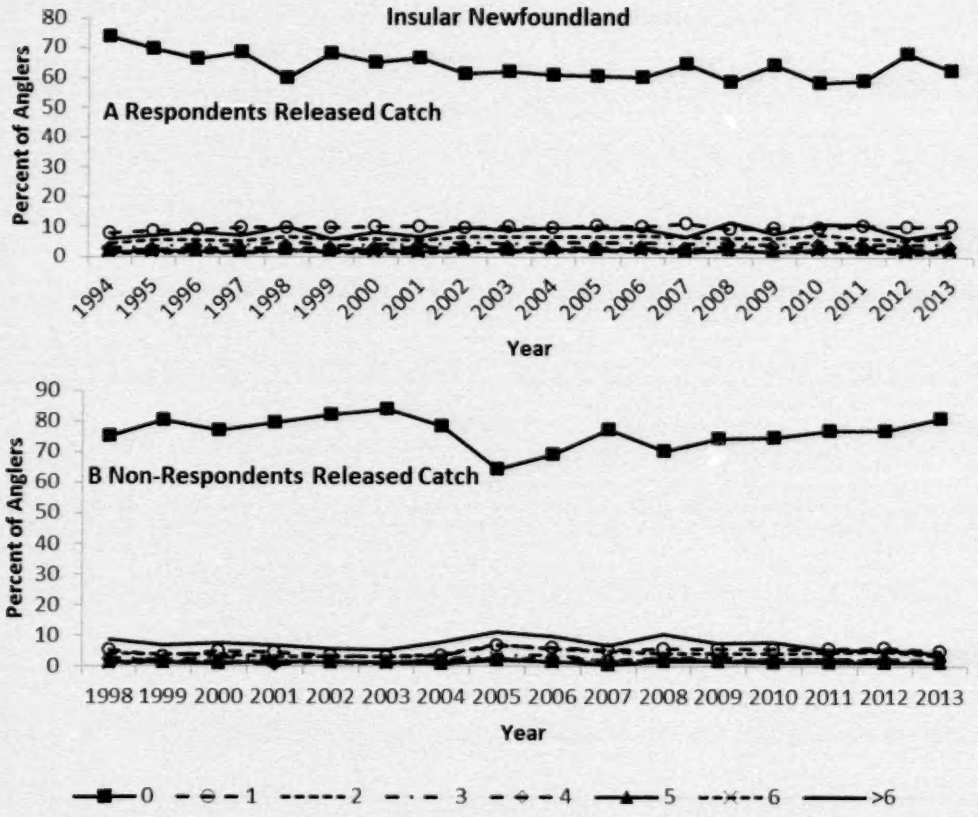


Figure 16. Trends in the percent of respondents (A) and non-respondents (B) reporting released catch of 0 to >6 Atlantic Salmon in Insular Newfoundland. Each line represents a different number of fish caught: solid line with squares = 0 fish, dashed line with open circles 1 fish, dashed line = 2 fish, dashed dotted line 3 fish, dashed line with open diamonds 4 fish, solid line with triangles 5 fish, dashed line with xs 6 fish, and solid line >6 fish.

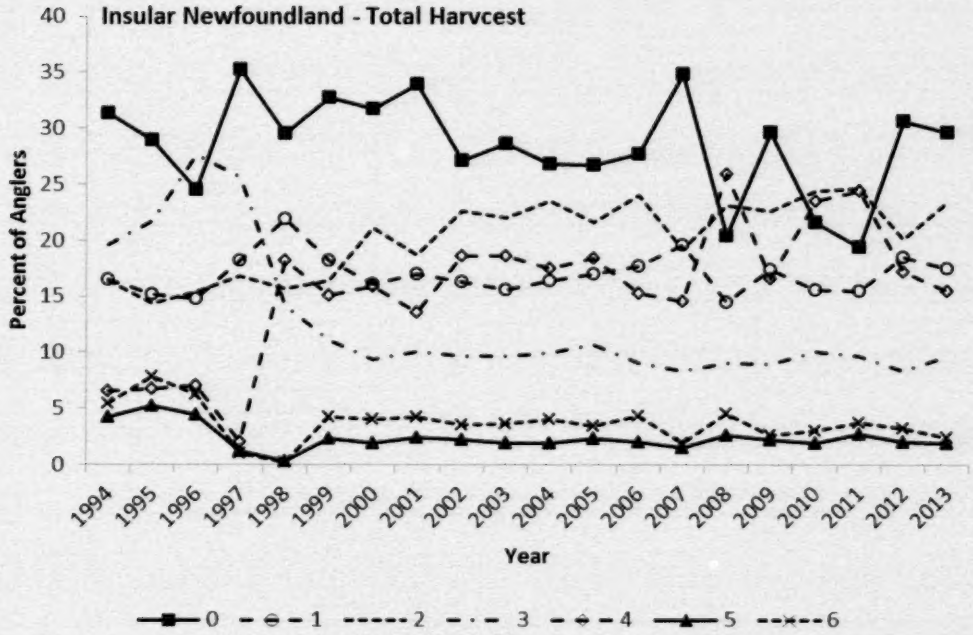


Figure 17. Trends in the percent of respondents reporting a total harvest of 0 to 6 Atlantic Salmon in Insular Newfoundland. Each line represents a different number of fish caught: solid line with squares = 0 fish, dashed line with open circles 1 fish, dashed line = 2 fish, dashed dotted line 3 fish, dashed line with open diamonds 4 fish, solid line with triangles 5 fish, and dashed line with xs 6 fish.

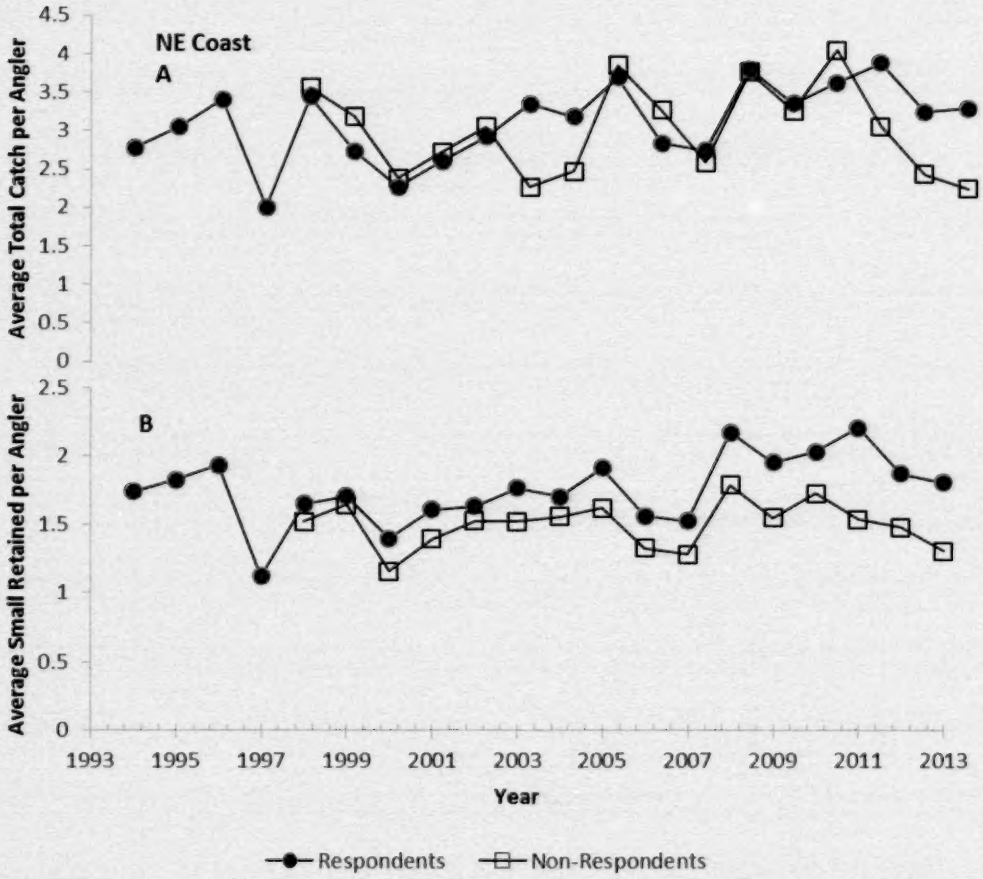


Figure 18. Trends in total catch (A) and small retained catch (B) of Atlantic Salmon on the Northeast (NE) Coast of insular Newfoundland. Filled circles represent respondents; open squares represent non-respondents.

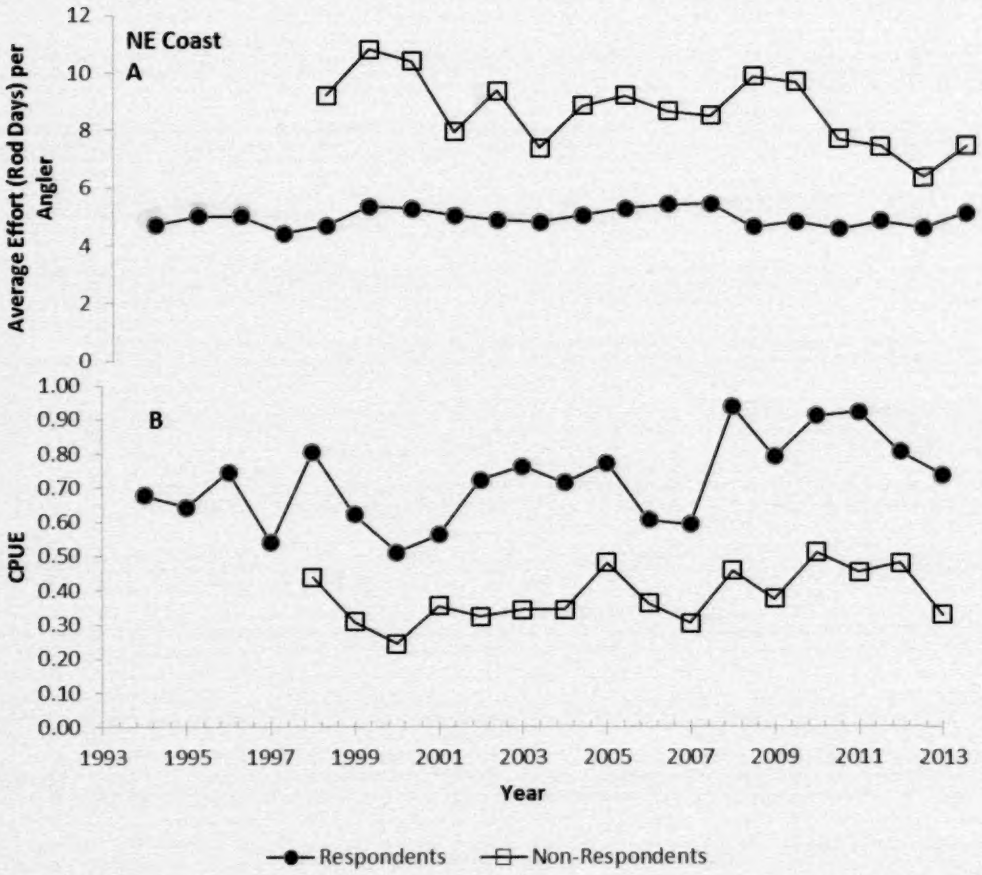


Figure 19. Trends in Atlantic Salmon angler effort and catch per unit effort (CPUE) on the Northeast (NE) coast of insular Newfoundland. Filled circles represent respondents; open squares represent non-respondents.

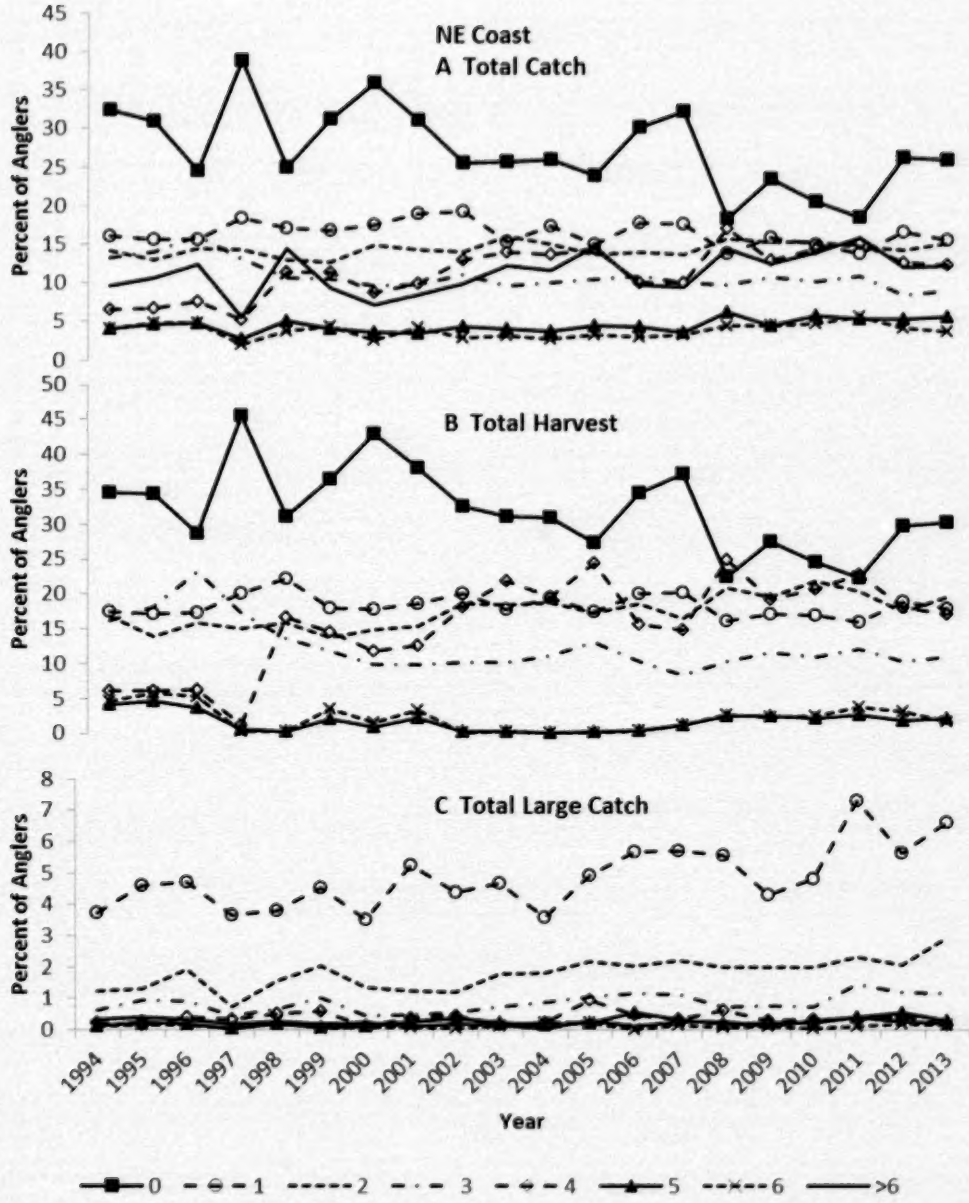


Figure 20. Trends in percent of respondents reporting a total catch (A) total harvest (B) and large catch (C) of 0 to >6 Atlantic Salmon on the Northeast (NE) Coast of insular Newfoundland from 1994 to 2013. Each line represents a different number of fish caught: solid line with squares = 0 fish, dashed line with open circles 1 fish, dashed line = 2 fish, dashed dotted line 3 fish, dashed line with open diamonds 4 fish, solid line with triangles 5 fish, dashed line with xs 6 fish, and solid line >6 fish. Percent of anglers reporting zero large catch are not shown in panel C.

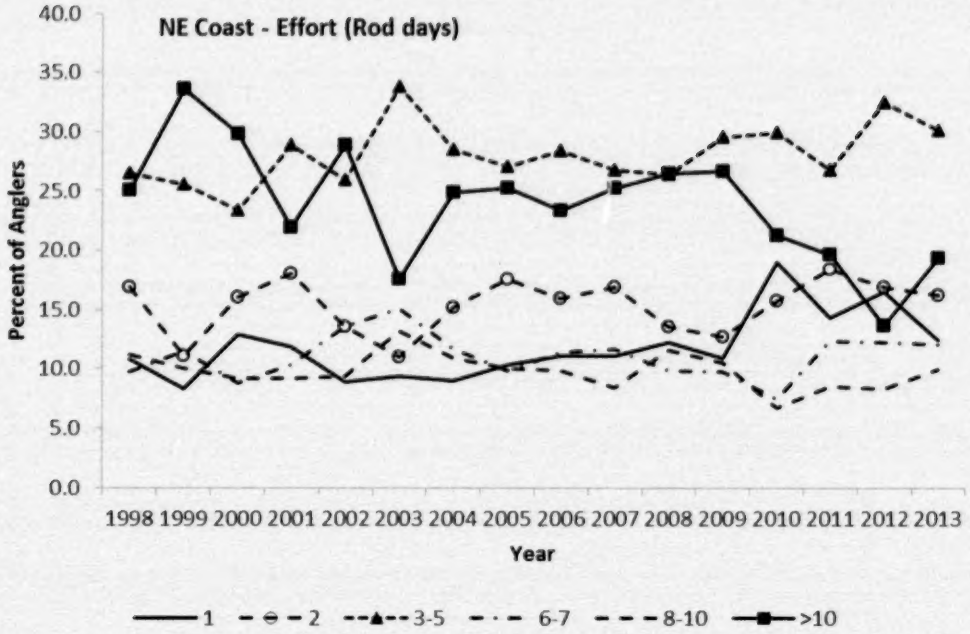


Figure 21. Trends in percent of Non-Respondents reporting various levels of effort (Rod Days) in Atlantic Salmon fishery on the Northeast (NE) Coast of insular Newfoundland. Each line represents a different number of days fished: solid line 1 day fished; dashed line with circles 2 days fished, dashed line with triangles 3 to 5 days fished; dashed dotted line 6 to 7 days fished; dashed line 8 to 10 days fished; solid line with squares >10 days fished.

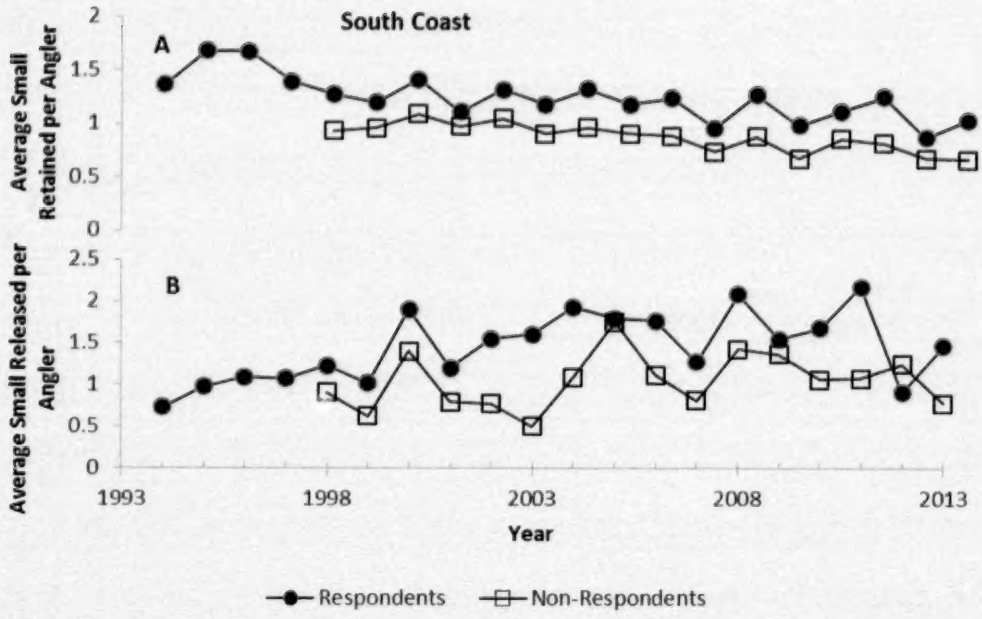


Figure 22. Trends in average annual harvest (A) and release (B) of small Atlantic Salmon on the South Coast of insular Newfoundland from 1994 to 2013. Filled circles represent respondents; open squares represent non-respondents.

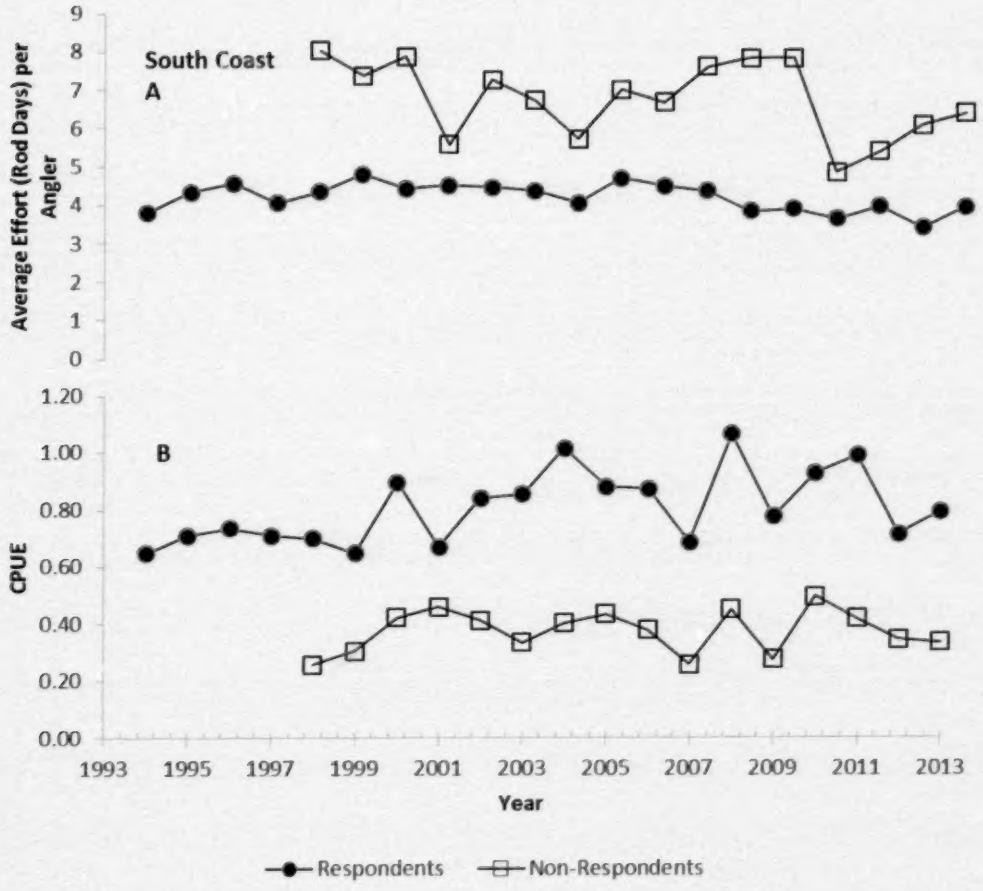


Figure 23. Trends in Atlantic Salmon angler effort (A) and CPUE (B) on the South Coast of insular Newfoundland from 1994 to 2013. Filled circles represent respondents; open squares represent non-respondents.

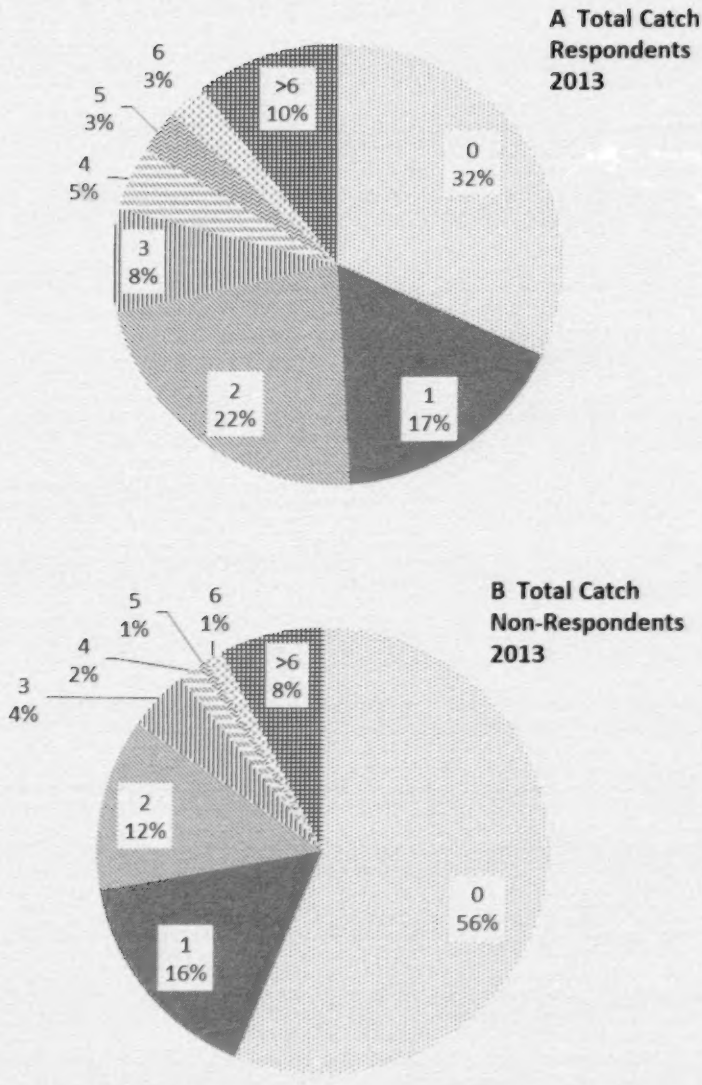


Figure 24. Percent of Respondents (A) and Non-Respondents (B) reporting a total catch of 0 to >6 Atlantic Salmon on the South Coast of insular Newfoundland in 2013.

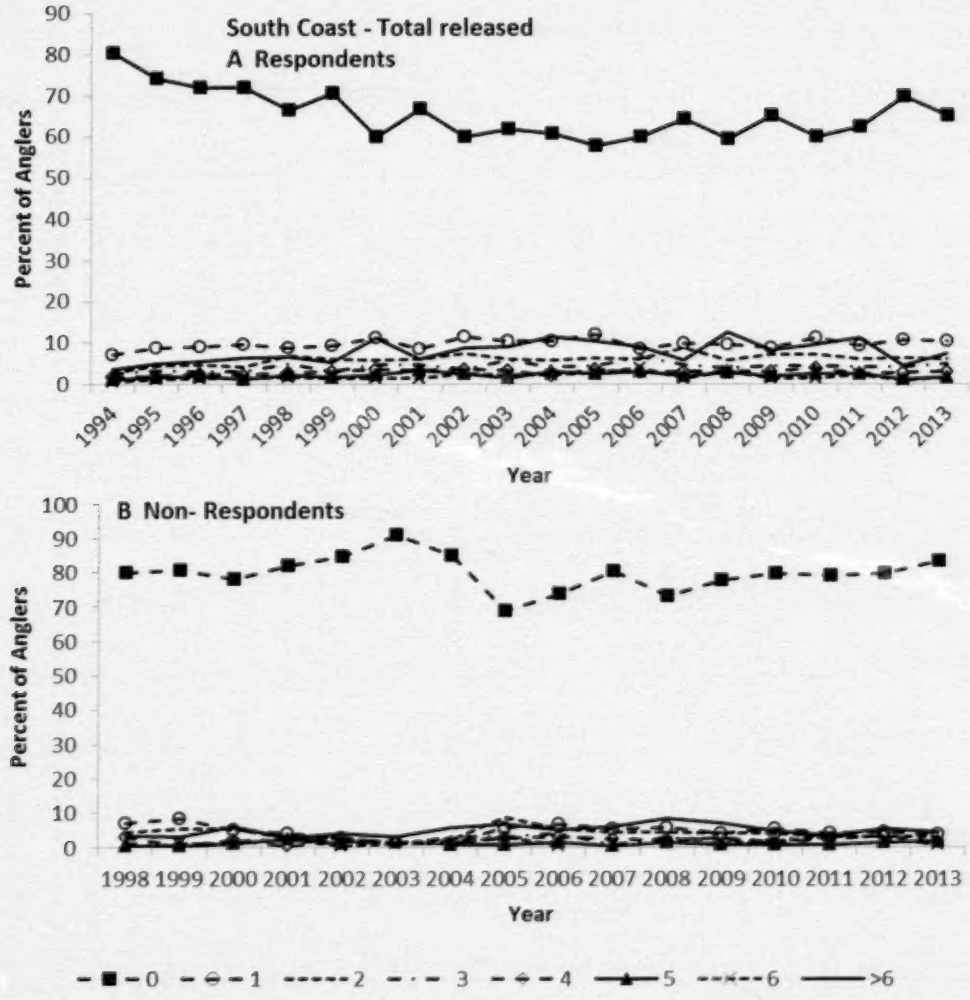


Figure 25. Trends in percent of Respondents (A) and Non-Respondents (B) reporting a released catch of 0 to >6 Atlantic Salmon on the South Coast of insular Newfoundland from 1994 to 2013. Each line represents a different number of fish caught: solid line with squares = 0 fish, dashed line with open circles 1 fish, dashed line = 2 fish, dashed dotted line 3 fish, dashed line with open diamonds 4 fish, solid line with triangles 5 fish, dashed line with xs 6 fish, and solid line >6 fish.

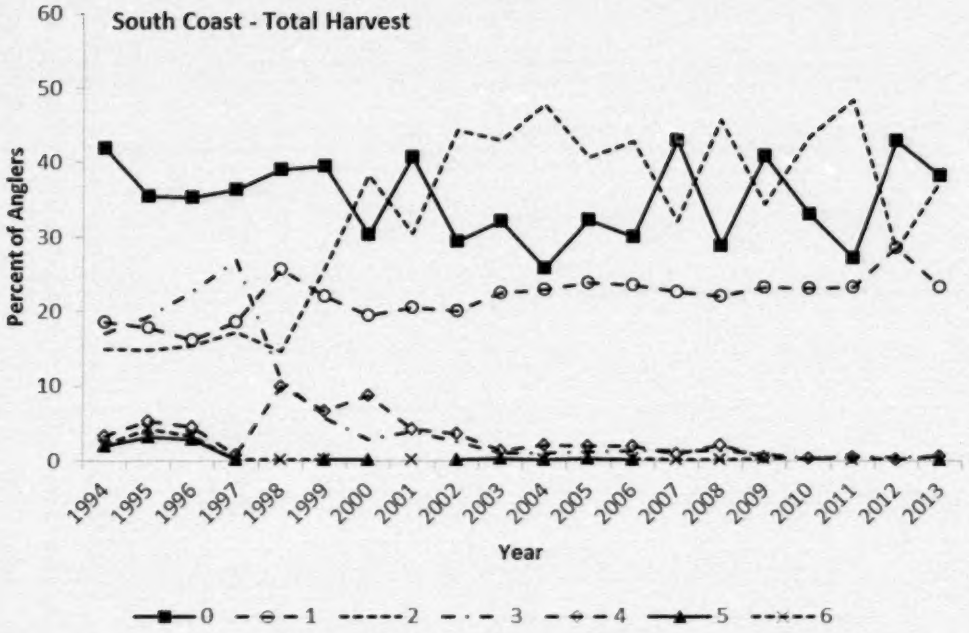


Figure 26. Trends in percent of Respondents reporting a total harvest of 0 to 6 Atlantic Salmon on the South Coast of insular Newfoundland from 1994 to 2013. Each line represents a different number of fish caught: solid line with squares = 0 fish, dashed line with open circles 1 fish, dashed line = 2 fish, dashed dotted line 3 fish, dashed line with open diamonds 4 fish, solid line with triangles 5 fish, and dashed line with xs 6 fish.

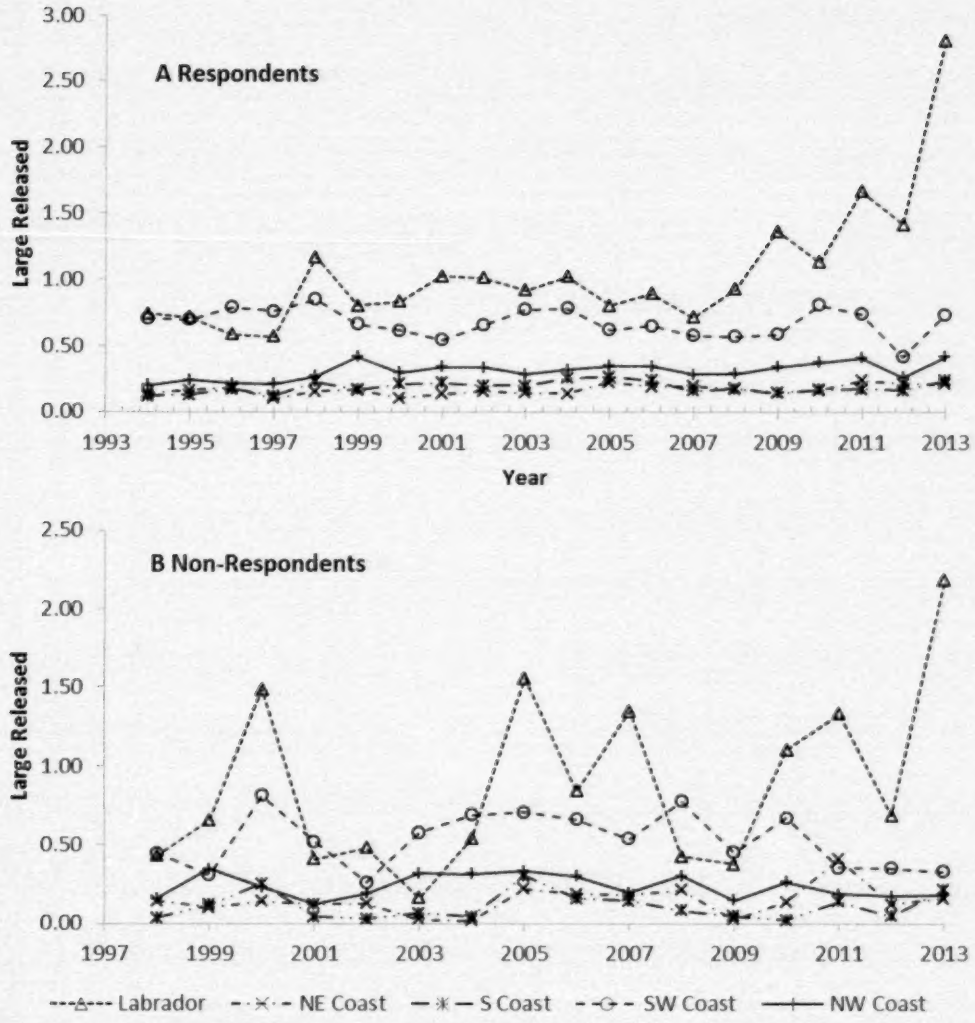


Figure 27. Comparison of trends in average number of released large Atlantic Salmon by anglers in different regions of Newfoundland and Labrador from 1994 to 2013.Each line represents a different region of the province: Dashed line with triangles represents Labrador; dashed dotted line with xs North East Coast; dashed line with * South Coast; dashed line with circles South West Coast; and solid line with +s North West Coast.

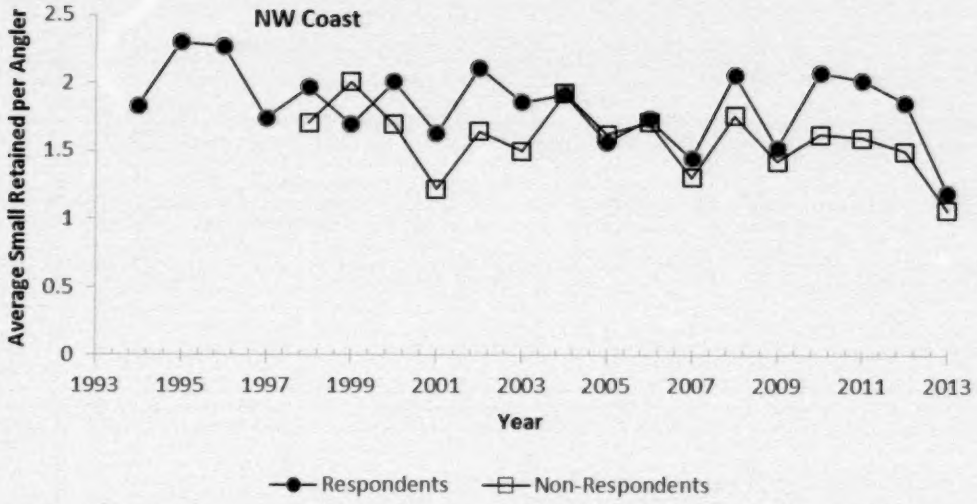


Figure 28. Trends in the average annual harvest of small (<63cm) Atlantic Salmon per angler on the Northwest (NW) Coast of insular Newfoundland from 1994 to 2013. Filled circles represent respondents; open squares represent non-respondents.

APPENDIX 1. SUMMARY OF PROVINCAL ANGLING DATA

Table 1. Total Atlantic Salmon catch and effort data for Newfoundland and Labrador from 1994 to 2013.

Year	Licences Sold	Effort (Rod Days)	Small* Retained	Small Released	Total Small Catch	Large* Retained	Large Released	Total Large Catch	Total Retained (Large + Small).	Total Released (Large + Small).	Total Catch (Large + Small).	CPUE†
1994	22596	141384	31774	24442	56216	455	5032	5487	32229	29474	61703	0.44
1995	21489	136028	33005	26273	59278	408	5166	5574	33413	31439	64852	0.48
1996	25553	162952	38005	34342	72347	334	6209	6543	38339	40551	78890	0.48
1997	21403	131559	25184	25316	50500	158	4720	4878	25342	30036	55378	0.42
1998	18490	131329	24799	31368	56167	231	4375	4606	25030	35743	60773	0.46
1999	17927	131432	24946	24567	49513	320	4153	4473	25266	28720	53986	0.41
2000	18316	138284	24369	29705	54074	262	6479	6741	24631	36184	60815	0.44
2001	17876	110754	23026	22348	45374	338	5184	5522	23364	27532	50896	0.46
2002	15937	103894	22984	23071	46055	207	3992	4199	23191	27063	50254	0.48
2003	17146	102915	23338	21379	44717	222	4965	5187	23560	26344	49904	0.48
2004	15657	99453	21754	23430	45184	259	5168	5427	22013	28598	50611	0.51
2005	15119	125613	23876	33129	57005	291	6598	6889	24167	39727	63894	0.51
2006	15596	113643	21050	30491	51541	227	5694	5921	21277	36185	57462	0.51
2007	14208	95585	16339	17719	34058	235	4607	4842	16574	22326	38900	0.41
2008	17842	152699	29433	32787	62220	200	7034	7234	29633	39821	69454	0.45
2009	19406	144931	24458	26681	51139	216	4272	4488	24674	30953	55627	0.38
2010	20971	128265	30495	39046	69541	197	6383	6580	30692	45429	76121	0.59
2011	21748	116951	28744	26240	54984	0	8119	8119	28744	34359	63103	0.54
2012	21518	113653	23269	20940	44209	0	4089	4089	23269	25029	48298	0.42
2013	22864	134348	24393	19962	44355	0	6770	6770	24393	26732	51125	0.38

*Small salmon are defined as having a fork length of <63cm; large salmon have a fork length of ≥63cm. † CPUE = catch per unit effort

Table 2. Atlantic Salmon mean and maximum annual catch and associated standard deviations reported by Respondents provincially from 1994 to 2013.

Year	n	Mean Small Retained	Max Small Retained	Std Dev Small Retained	Mean Small Released	Max Small Released	Std Dev Small Released	Mean Large Retained	Max Large Retained	Std Dev Large Retained	Mean Large Released	Max Large Released	Std Dev Large Released
1994	9742	1.9	11	1.8	1.3	104	4.2	0.04	4	0.26	0.3	43	1.5
1995	10284	2.1	10	1.9	1.5	99	4.6	0.03	4	0.17	0.3	50	1.4
1996	10777	2.2	12	1.8	1.7	88	5.1	0.02	5	0.16	0.4	70	1.5
1997	7349	1.5	6	1.4	1.4	72	4.1	0.02	3	0.13	0.3	30	1.4
1998	5084	1.8	6	1.5	2.0	100	4.6	0.03	1	0.17	0.4	100	2.4
1999	4902	1.8	6	1.7	1.4	95	4.1	0.03	1	0.17	0.4	55	1.6
2000	4080	1.9	6	1.7	2.0	150	5.5	0.02	1	0.15	0.4	50	1.5
2001	4347	1.8	6	1.7	1.5	175	4.5	0.03	3	0.17	0.4	40	1.6
2002	4742	2.0	6	1.7	2.0	89	4.8	0.02	1	0.14	0.4	35	1.5
2003	4467	1.9	6	1.7	2.0	88	4.9	0.02	1	0.15	0.5	35	1.7
2004	4710	2.0	6	1.7	2.2	93	5.5	0.02	2	0.15	0.5	32	1.7
2005	4182	2.0	6	1.7	2.2	87	5.1	0.03	1	0.16	0.5	21	1.5
2006	4303	1.9	6	1.7	2.2	95	5.3	0.03	4	0.18	0.5	52	1.6
2007	3840	1.6	6	1.6	1.5	51	4.0	0.02	2	0.15	0.4	36	1.4
2008	3957	2.3	6	1.7	2.5	80	5.8	0.02	1	0.15	0.4	35	1.5
2009	3931	1.8	6	1.6	1.7	128	4.7	0.02	1	0.15	0.4	33	1.7
2010	4439	2.1	6	1.6	2.1	72	4.8	0.01	1	0.12	0.5	30	1.6
2011	4201	2.3	6	1.7	2.2	106	5.5	0	0	0	0.5	32	1.6
2012	3368	1.8	6	1.7	1.4	69	4.1	0	0	0	0.4	18	1.3
2013	2761	1.8	6	1.6	1.8	88	4.8	0	0	0	0.6	44	2.2

n = number of Respondents. Small salmon have a fork length of <63cm, large salmon have fork length ≥63cm.

Table 3. Atlantic Salmon mean and maximum annual catch and associated standard deviations reported by Non-Respondents Provincially from 1998 to 2013.

Year	n	Mean Small Retained	Max Small Retained	Std. Dev Small Retained	Mean Small Released	Max Small Released	Std. Dev Small Released	Mean Large Retained	Max Large Retained	Std. Dev Large Retained	Mean Large Released	Max Large Released	Std. Dev Large Released
1998	1069	1.5	6	1.5	2.0	150	7.5	0.01	1	0.09	0.21	20	1.15
1999	1180	1.6	6	1.8	1.7	88	6.3	0.01	1	0.09	0.21	16	1.11
2000	1464	1.5	6	1.7	1.7	137	7.2	0.00	1	0.03	0.41	45	2.16
2001	1490	1.5	6	1.7	1.3	73	5.1	0.00	4	0.11	0.27	13	1.09
2002	1689	1.6	6	1.6	1.4	100	5.9	0.00	1	0.05	0.21	54	1.65
2003	1489	1.6	6	1.6	1.1	81	5.1	0.00	1	0.04	0.24	18	1.26
2004	1468	1.7	6	1.6	1.5	126	5.9	0.01	1	0.07	0.29	44	1.95
2005	1573	1.7	6	1.7	2.6	180	8.5	0.00	1	0.06	0.55	60	2.53
2006	1694	1.5	6	1.6	2.4	135	7.8	0.02	1	0.14	0.43	56	2.35
2007	1462	1.3	6	1.5	1.3	128	5.6	0.01	1	0.07	0.39	20	1.59
2008	1516	1.8	6	1.7	1.9	62	5.3	0.00	1	0.04	0.42	50	2.27
2009	1210	1.5	6	1.6	1.6	80	5.0	0.00	1	0.05	0.18	28	1.25
2010	1640	1.7	6	1.7	2.4	190	11.2	0.00	1	0.04	0.34	47	2.18
2011	1482	1.6	6	1.6	1.3	81	4.8	0	0	0	0.41	60	2.47
2012	1347	1.4	6	1.6	1.3	75	5.0	0	0	0	0.21	18	1.06
2013	1552	1.3	6	1.6	0.9	42	3.3	0	0	0	0.35	24	1.76

n = number of Non-respondents surveyed. Small salmon have a fork length of <63cm, large salmon have fork length ≥63cm.

Table 4. Percent of Respondents reporting the retention of 0 to 6 small Atlantic Salmon in Newfoundland and Labrador from 1994 to 2013.

Year	0 Small Retained	1 Small Retained	2 Small Retained	3 Small Retained	4 Small Retained	5 Small Retained	6 Small Retained
1994	31.1%	16.1%	16.4%	19.3%	7.1%	4.5%	5.5%
1995	28.4%	15.1%	14.5%	21.4%	7.2%	5.7%	7.7%
1996	24.4%	14.8%	15.3%	27.1%	7.3%	4.8%	6.3%
1997	34.5%	18.3%	16.6%	25.1%	2.7%	1.7%	1.1%
1998	28.3%	21.3%	16.1%	15.7%	18.1%	0.3%	0.2%
1999	31.5%	18.4%	17.2%	12.0%	14.6%	2.4%	3.9%
2000	30.4%	15.9%	21.7%	10.7%	15.7%	1.9%	3.7%
2001	32.9%	17.3%	20.0%	10.7%	12.8%	2.4%	3.9%
2002	26.7%	16.1%	23.8%	10.1%	17.8%	2.1%	3.5%
2003	27.5%	16.0%	23.0%	10.7%	17.7%	1.8%	3.4%
2004	26.1%	16.3%	24.3%	10.9%	16.7%	1.8%	3.8%
2005	25.7%	16.8%	22.2%	11.5%	18.3%	2.3%	3.2%
2006	26.7%	17.3%	24.7%	10.1%	15.2%	1.9%	4.1%
2007	33.5%	19.2%	20.4%	9.1%	14.6%	1.4%	1.8%
2008	20.0%	14.7%	23.9%	9.9%	24.8%	2.5%	4.2%
2009	29.4%	17.2%	22.7%	9.8%	16.2%	2.1%	2.6%
2010	21.6%	15.7%	24.5%	10.8%	22.7%	1.8%	2.9%
2011	19.4%	15.1%	25.1%	9.8%	24.3%	2.6%	3.6%
2012	30.0%	18.3%	20.9%	8.6%	17.2%	1.8%	3.2%
2013	28.9%	17.3%	23.8%	9.6%	16.3%	1.9%	2.3%

Small salmon have a fork length of <63cm.

Table 5. Percent of Respondents reporting the release of 0 to > 6 small Atlantic Salmon in Newfoundland and Labrador from 1994 to 2013.

Year	0 Small Released	1 Small Released	2 Small Released	3 Small Released	4 Small Released	5 Small Released	6 Small Released	>6 Small Released
1994	76.9%	6.4%	4.2%	2.7%	1.8%	1.3%	1.1%	5.5%
1995	73.8%	7.3%	4.7%	2.9%	2.2%	1.4%	1.0%	6.7%
1996	69.7%	7.8%	5.3%	3.6%	2.8%	1.9%	1.4%	7.5%
1997	72.1%	8.2%	4.8%	3.5%	2.0%	1.6%	1.3%	6.5%
1998	61.9%	8.9%	6.1%	5.2%	3.4%	2.6%	2.0%	10.0%
1999	71.2%	8.2%	5.4%	3.1%	2.4%	2.0%	1.3%	6.3%
2000	66.4%	8.8%	5.8%	3.3%	2.8%	1.7%	1.6%	9.6%
2001	69.5%	8.8%	5.1%	3.8%	2.6%	1.9%	1.5%	6.8%
2002	63.5%	9.1%	6.2%	4.3%	2.9%	2.4%	2.0%	9.6%
2003	64.6%	8.8%	6.0%	4.0%	3.5%	2.2%	1.8%	9.1%
2004	63.8%	8.2%	6.1%	4.0%	2.7%	2.5%	1.9%	10.7%
2005	62.7%	8.9%	6.0%	4.1%	3.2%	2.5%	1.7%	11.1%
2006	63.1%	8.6%	6.4%	4.2%	3.2%	2.3%	1.8%	10.4%
2007	68.9%	8.6%	6.2%	3.8%	2.4%	1.5%	1.5%	7.0%
2008	61.3%	7.9%	6.4%	4.2%	3.5%	2.2%	2.2%	12.2%
2009	67.9%	8.3%	6.0%	3.3%	2.7%	2.1%	1.8%	7.9%
2010	61.7%	9.1%	6.7%	4.6%	3.3%	2.4%	1.6%	10.6%
2011	63.0%	8.9%	5.7%	4.3%	3.3%	2.3%	1.7%	10.9%
2012	71.2%	8.3%	5.1%	3.7%	2.3%	1.5%	1.2%	6.7%
2013	67.0%	8.9%	6.3%	4.0%	2.4%	2.0%	1.6%	7.8%

Small salmon have a fork length of <63cm.

Table 6. Percentage of Respondents reporting the retention of 0 to 2 large Atlantic Salmon in Labrador from 1994 to 2013.

Year	0 Large Retained	1 Large Retained	2 Large Retained
1994	70.1%	16.0%	13.0%
1995	65.5%	33.6%	0.6%
1996	71.2%	27.7%	1.0%
1997	81.9%	17.7%	0.3%
1998	75.8%	24.2%	0.0%
1999	74.5%	25.5%	0.0%
2000	82.7%	17.3%	0.0%
2001	79.6%	19.7%	0.5%
2002	82.6%	17.4%	0.0%
2003	82.6%	17.4%	0.0%
2004	82.5%	17.1%	0.3%
2005	79.9%	20.1%	0.0%
2006	77.1%	22.4%	0.4%
2007	81.3%	18.3%	0.4%
2008	77.8%	22.2%	0.0%
2009	77.1%	22.9%	0.0%
2010	82.5%	17.5%	0.0%
2011	100.0%	0.0%	0.0%
2012	100.0%	0.0%	0.0%
2013	100.0%	0.0%	0.0%

Large salmon have a fork length of ≥63cm. Retention of large salmon in Labrador has not been permitted since 2011.

Table 7. Percent of Respondents reporting the release of 0 to >6 large Atlantic Salmon in Newfoundland and Labrador from 1994 to 2013.

Year	0 Large Released	1 Large Released	2 Large Released	3 Large Released	4 Large Released	5 Large Released	6 Large Released	>6 Large Released
1994	88.1%	5.6%	2.4%	1.1%	0.8%	0.6%	0.3%	1.1%
1995	86.6%	6.6%	2.7%	1.7%	0.7%	0.5%	0.3%	0.9%
1996	86.4%	6.6%	2.9%	1.4%	0.9%	0.5%	0.4%	1.0%
1997	87.4%	6.9%	2.1%	1.3%	0.7%	0.4%	0.2%	0.9%
1998	86.0%	6.1%	3.1%	1.6%	1.0%	0.6%	0.4%	1.2%
1999	84.8%	6.8%	3.2%	1.8%	1.4%	0.6%	0.5%	0.9%
2000	85.6%	7.3%	3.1%	1.5%	0.7%	0.6%	0.4%	0.9%
2001	83.4%	8.2%	3.3%	1.8%	1.1%	0.6%	0.4%	1.2%
2002	83.4%	7.3%	3.6%	2.2%	1.3%	0.6%	0.4%	1.1%
2003	83.0%	7.9%	3.6%	1.9%	1.0%	0.7%	0.4%	1.4%
2004	81.1%	8.4%	4.6%	2.2%	1.2%	0.8%	0.5%	1.3%
2005	81.0%	9.2%	3.9%	2.6%	1.0%	0.8%	0.5%	1.1%
2006	80.9%	8.6%	4.9%	2.2%	1.1%	0.7%	0.4%	1.1%
2007	81.5%	9.5%	4.0%	2.2%	0.9%	0.9%	0.4%	0.7%
2008	82.7%	8.9%	3.5%	1.6%	1.1%	0.6%	0.5%	1.0%
2009	83.3%	7.9%	4.0%	1.6%	1.0%	0.8%	0.4%	1.1%
2010	82.0%	8.0%	4.0%	2.3%	1.2%	0.7%	0.4%	1.4%
2011	79.3%	9.8%	4.4%	2.6%	1.3%	0.7%	0.5%	1.4%
2012	84.6%	7.7%	3.0%	1.9%	0.8%	0.6%	0.3%	1.0%
2013	78.3%	9.2%	5.0%	2.8%	1.1%	1.2%	0.3%	2.1%

Large salmon have a fork length of ≥63cm.

Table 8. Percent of Respondents reporting a total catch (small + large, retained + released) of 0 to >6 Atlantic Salmon in Newfoundland and Labrador from 1994 to 2013.

Year	0 Total Catch	1 Total Catch	2 Total Catch	3 Total Catch	4 Total Catch	5 Total Catch	6 Total Catch	>6 Total Catch
1994	28.6%	14.6%	13.2%	13.7%	7.1%	4.6%	4.5%	13.7%
1995	25.3%	13.5%	12.4%	14.7%	7.1%	5.3%	5.8%	15.9%
1996	20.6%	13.0%	13.0%	17.1%	8.1%	5.5%	5.6%	17.1%
1997	28.5%	16.3%	14.1%	15.1%	6.5%	3.8%	3.3%	12.4%
1998	21.9%	15.0%	12.5%	10.9%	11.6%	5.3%	3.9%	19.0%
1999	26.1%	16.1%	12.7%	9.9%	10.8%	4.5%	4.7%	15.2%
2000	23.8%	14.7%	15.0%	9.4%	10.0%	4.8%	4.2%	18.2%
2001	25.4%	15.5%	14.7%	10.0%	9.6%	4.4%	4.3%	15.9%
2002	20.1%	13.9%	15.1%	9.6%	11.7%	5.4%	4.7%	19.5%
2003	20.9%	12.9%	16.1%	9.2%	12.0%	5.2%	4.7%	19.0%
2004	20.2%	13.0%	14.8%	9.3%	11.6%	5.3%	4.8%	21.0%
2005	20.1%	13.6%	13.5%	9.4%	11.6%	5.0%	5.1%	21.6%
2006	20.5%	13.9%	14.9%	9.5%	10.1%	5.4%	5.3%	20.3%
2007	27.3%	15.6%	14.0%	9.0%	10.2%	4.9%	4.0%	15.1%
2008	15.5%	12.1%	14.9%	8.3%	14.2%	6.2%	5.1%	23.7%
2009	23.6%	14.2%	15.3%	9.1%	11.3%	4.7%	4.9%	17.0%
2010	16.7%	12.2%	15.6%	9.6%	14.0%	5.5%	5.1%	21.3%
2011	15.6%	12.1%	15.4%	9.1%	14.4%	5.4%	5.7%	22.2%
2012	25.9%	15.3%	14.6%	8.6%	11.6%	5.3%	4.4%	14.4%
2013	23.8%	13.8%	15.5%	8.8%	10.1%	5.2%	4.2%	18.7%

Small salmon have a fork length of <63cm; large salmon have a fork length of ≥63cm.

Table 9. Percent of Non-Respondents reporting the retention of 0 to 6 small Atlantic Salmon in Newfoundland and Labrador from 1998 to 2013.

Year	0 Small Retained	1 Small Retained	2 Small Retained	3 Small Retained	4 Small Retained	5 Small Retained	6 Small Retained
1998	37.7%	18.0%	17.6%	12.4%	13.5%	0.7%	0.2%
1999	38.9%	15.7%	18.1%	8.6%	11.4%	2.5%	4.7%
2000	40.8%	17.4%	17.1%	8.4%	11.4%	1.8%	3.1%
2001	42.5%	15.3%	18.7%	7.4%	11.1%	1.7%	3.2%
2002	34.0%	17.6%	22.7%	8.2%	14.0%	1.7%	1.8%
2003	37.1%	17.1%	19.8%	9.4%	13.6%	0.9%	2.1%
2004	33.5%	15.9%	22.3%	9.7%	14.4%	1.3%	2.9%
2005	34.6%	16.0%	19.4%	9.5%	14.7%	1.7%	3.9%
2006	39.2%	15.8%	19.5%	8.7%	13.1%	1.5%	2.2%
2007	43.6%	16.8%	19.4%	6.6%	10.7%	1.4%	1.7%
2008	32.1%	14.6%	23.3%	8.0%	16.7%	2.0%	3.3%
2009	42.1%	14.8%	19.1%	7.6%	13.1%	1.6%	1.7%
2010	34.9%	15.5%	19.1%	9.4%	16.2%	2.3%	2.6%
2011	36.4%	17.9%	20.5%	7.7%	14.3%	1.3%	1.8%
2012	42.3%	17.5%	17.6%	7.2%	11.5%	1.8%	2.1%
2013	48.1%	15.3%	16.6%	6.1%	11.0%	1.3%	1.7%

Small salmon have a fork length of <63cm.

Table 10. Percent of Non-Respondents reporting the release of 0 to >6 small Atlantic Salmon in Newfoundland and Labrador from 1998 to 2013.

Year	0 Small Released	1 Small Released	2 Small Released	3 Small Released	4 Small Released	5 Small Released	6 Small Released	>6 Small Released
1998	77.8	4.2	3.5	2.4	2.0	0.7	1.0	8.3
1999	81.8	2.8	3.8	1.8	0.9	1.1	1.2	6.6
2000	80.9	3.1	3.8	2.5	1.1	1.0	0.7	6.9
2001	83.7	2.9	2.5	1.7	0.7	1.2	1.5	5.8
2002	82.4	3.3	2.8	1.5	2.1	1.5	1.1	5.3
2003	87.3	1.7	2.4	1.0	1.1	1.3	0.7	4.5
2004	81.5	1.9	3.2	2.2	2.0	1.2	1.2	6.9
2005	68.3	5.3	6.4	2.5	3.2	2.0	1.9	10.4
2006	72.0	5.2	4.5	3.1	2.7	1.2	1.5	9.8
2007	79.9	4.2	4.2	1.5	2.0	1.4	1.2	5.6
2008	73.7	4.6	3.4	2.4	2.8	1.5	2.3	9.3
2009	75.3	5.2	3.5	3.2	1.9	1.9	1.5	7.5
2010	77.7	4.4	3.9	2.3	1.8	1.3	1.6	7.0
2011	80.2	4.3	3.5	2.0	2.3	0.8	1.7	5.2
2012	80.3	4.9	4.4	1.9	1.8	0.9	0.9	5.0
2013	83.8	3.7	3.8	1.5	1.9	1.1	0.8	3.5

Small salmon have a fork length of <63cm.

Table 11. Percent of Non-respondents reporting the retention of 0 to 2 large Atlantic Salmon in Labrador.

Year	0 Large Retained	1 Large Retained	2 Large Retained
1998	85.2%	14.8%	0.0%
1999	80.8%	19.2%	0.0%
2000	96.6%	3.4%	0.0%
2001	97.6%	1.2%	0.0%
2002	97.6%	2.4%	0.0%
2003	96.6%	3.4%	0.0%
2004	90.9%	9.1%	0.0%
2005	94.8%	5.2%	0.0%
2006	77.8%	22.2%	0.0%
2007	93.0%	7.0%	0.0%
2008	97.9%	2.1%	0.0%
2009	94.6%	5.4%	0.0%
2010	94.9%	5.1%	0.0%
2011	100.0%	0.0%	0.0%
2012	100.0%	0.0%	0.0%
2013	100.0%	0.0%	0.0%

Large salmon have a fork length of ≥63cm. Retention of large salmon in Labrador has not been permitted since 2011.

Table 12. Percent of Non-respondents reporting the release of 0 to >6 large Atlantic Salmon in Newfoundland and Labrador from 1998 to 2013.

Year	0 Large Released	1 Large Released	2 Large Released	3 Large Released	4 Large Released	5 Large Released	6 Large Released	>6 Large Released
1998	93.5%	2.3%	1.8%	0.6%	0.5%	0.5%	0.4%	0.6%
1999	93.6%	2.7%	1.1%	0.3%	0.9%	0.3%	0.3%	0.8%
2000	88.8%	4.8%	2.2%	1.2%	0.7%	0.3%	0.5%	1.6%
2001	90.4%	4.0%	1.8%	1.3%	0.7%	0.6%	0.3%	0.9%
2002	93.4%	2.4%	2.0%	0.7%	0.6%	0.3%	0.2%	0.4%
2003	93.3%	2.0%	1.7%	0.9%	0.6%	0.3%	0.2%	0.9%
2004	92.4%	3.1%	1.7%	0.5%	0.6%	0.5%	0.2%	0.9%
2005	84.0%	6.8%	4.0%	1.7%	0.8%	0.3%	0.5%	2.0%
2006	87.8%	4.9%	2.9%	1.3%	0.7%	0.7%	0.4%	1.3%
2007	87.7%	4.9%	2.7%	1.4%	0.9%	0.6%	0.3%	1.5%
2008	87.1%	5.5%	3.8%	0.9%	0.9%	0.3%	0.4%	1.1%
2009	94.1%	3.2%	0.9%	0.6%	0.2%	0.1%	0.1%	0.7%
2010	90.9%	4.1%	1.8%	1.0%	0.7%	0.1%	0.2%	1.1%
2011	89.5%	4.2%	2.5%	0.9%	0.7%	0.3%	0.5%	1.3%
2012	92.1%	3.1%	2.2%	1.1%	0.7%	0.2%	0.1%	0.5%
2013	90.5%	3.9%	1.6%	1.0%	0.8%	0.6%	0.2%	1.4%

Large salmon have a fork length of ≥63cm.

Table 13. Percent of Non-Respondents reporting a total catch (small + large, retained + released) of 0 to >6 Atlantic Salmon in Newfoundland and Labrador from 1998 to 2013.

Year	0 Total Catch	1 Total Catch	2 Total Catch	3 Total Catch	4 Total Catch	5 Total Catch	6 Total Catch	>6 Total Catch
1998	35.3	15.3	12.5	9.6	8.8	3.7	2.8	11.9
1999	37.5	14.9	15.6	7.0	6.9	2.5	2.9	12.7
2000	38.7	14.8	13.1	7.1	7.5	3.4	3.1	12.3
2001	40.3	14.1	14.8	6.9	6.7	2.8	2.9	11.6
2002	32.3	15.6	18.9	8.2	9.8	2.0	2.7	10.6
2003	35.5	15.8	17.9	8.3	9.7	2.1	2.2	8.5
2004	31.9	15.0	16.8	7.9	10.1	2.2	2.9	13.2
2005	30.0	13.7	12.7	7.4	8.5	3.6	4.5	19.7
2006	35.6	13.8	11.9	6.4	7.7	4.1	3.7	16.7
2007	40.2	15.5	14.0	5.9	7.3	2.2	2.8	12.2
2008	29.9	13.2	14.4	7.5	9.4	3.7	3.5	18.3
2009	40.3	12.0	14.2	5.9	6.9	3.4	3.4	13.9
2010	33.3	14.1	14.5	7.4	10.1	3.4	3.2	14.1
2011	34.1	15.9	15.0	7.7	9.0	3.1	3.4	11.7
2012	39.8	15.4	13.0	6.5	8.2	3.3	3.6	10.1
2013	46.1	13.7	11.9	6.4	6.7	2.6	3.1	9.5

Small salmon have a fork length of <63cm; large salmon have a fork length of ≥63cm.